ATTACHMENT 29

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

IN RE: DA VINCI SURGICAL ROBOTS ANTITRUST LITIGATION	Lead Case No. 3:21-CV-03825
THIS DOCUMENT RELATES TO: ALL CASES	

EXPERT REBUTTAL REPORT OF LOREN K. SMITH, PH.D.
January 20, 2023

HIGHLY CONFIDENTIAL—SUBJECT TO PROTECTIVE ORDER

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I. INTRODUCTION

A. QUALIFICATIONS

1. My name is Loren K. Smith. I am a Principal at The Brattle Group and have been an economic consultant since April 2013. From September 2005 to March 2013, I was a staff economist at the U.S. Federal Trade Commission ("FTC"). I received my Ph.D. in economics from the University of Virginia in 2006.

2. I specialize in the application of economic and econometric tools to antitrust and competition matters. I have taught economics and econometrics to undergraduates and graduate students at the University of Virginia and Johns Hopkins University. I have taught courses on the application of economic and econometric tools to antitrust matters to lawyers and economists of foreign antitrust agencies in South Africa, Hungary, and Brazil, and at Fordham University. My research has been published in leading economics and antitrust journals, including the Journal of Applied Econometrics, the Journal of Economics and Management Strategy, and Antitrust Source.

3. While at the FTC, I led economic investigations into high-profile mergers and conduct matters, including in healthcare generally and medical devices, specifically. I also supported litigation and settlement efforts. Since leaving the FTC for private practice, I have consulted with clients on government investigations, federal merger challenges, and private litigations in a wide variety of industries, including healthcare, retail, lodging, medical devices, and various consumer products and intermediate goods.

4. I have significant experience studying the economics of healthcare, including several matters that required detailed economic analyses of competition among healthcare suppliers and providers. On behalf of healthcare providers as well as for the government, I have analyzed the competitive impact of healthcare provider mergers, including numerous hospital mergers. I recently testified

as the economic expert for the Plaintiffs in *FTC et al. v. Thomas Jefferson University et al.*[1] Both at the FTC and in private practice, I have assessed unilateral conduct in the healthcare industry, including analyses of market definition, market power, conduct, effects and justifications.

5. I provided expert testimony in *Rebotix Repair LLC v. Intuitive Surgical, Inc.* and *Restore Robotics LLC, Restore Robotics Repair LLC, and Clif Parker Robotics LLC v. Intuitive Surgical, Inc*. In both cases, I submitted expert reports on (i) the profits to be disgorged from the plaintiffs and (ii) Intuitive's lost profits from the "[plaintiffs'] alleged false advertising, unfair competition, deceptive and unfair trade practices, and tortious interference with contract."[2] I also submitted expert reports addressing, from an economics perspective, the plaintiffs' allegations that Intuitive engaged in conduct to "monopoliz[e] trade in the worldwide and domestic aftermarkets for service of da Vinci surgical robots and the worldwide and domestic aftermarkets for service and replacement of EndoWrist surgical robotic instruments."[3] In *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, I submitted an expert report responding to the damages analysis of the plaintiff's expert.[4]

6. On December 2, 2022, I submitted an expert report in *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.* that "evaluate[s] the extent of Intuitive's damages from the misconduct alleged in its counterclaims against Surgical Instrument Service Company, Inc. ('SIS,'

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[1] 20-cv-03499, Pennsylvania Eastern District Court, September 15 and 16, and October 1, 2020.

[2] Expert Report of Loren K. Smith, Ph.D., *Restore Robotics LLC and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.*, Case No. 5:19-cv-55, August 20, 2021, ¶ 6. Expert Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274, July 26, 2021, ¶ 6.

[3] Expert Rebuttal Report of Loren K. Smith, Ph.D., *Restore Robotics LLC, Restore Robotics Repair LLC, and Clif Parker Robotics LLC v. Intuitive Surgical, Inc.*, Case No. 5:19-cv-55, September 27, 2021, ¶ 7. Expert Antitrust Merits Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274, August 30, 2021, ¶ 7. Rebotix's claims did not include "service of da Vinci surgical robots."

[4] Expert Damages Rebuttal Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc.*, Case No. 8:20-cv-02274, August 30, 2021, ¶ 7.

'Plaintiff,' or 'Counterclaims Defendant')…."[5] On January 18, 2023, I submitted expert reports that review and analyze the opinions of Dr. Russell Lamb and Mr. Richard Bero, which were offered on behalf of Surgical Instrument Service Company, Inc. ("SIS").[6]

7. My curriculum vitae, which provides additional details about my qualifications, including my prior testimony and publications, is provided in Exhibit A.

B. ASSIGNMENT

8. I have been asked by counsel for Intuitive Surgical, Inc. ("Intuitive") to review and analyze, from an economic perspective, certain aspects of the Consolidated Amended Class Action Complaint,[7] including a competitive assessment of the challenged conduct, as well as the expert report submitted by Professor Einer Elhauge on behalf of the Plaintiffs.[8]

9. In response to Professor Elhauge, this report focuses on the proper economic approach for assessing the competitive effects of the challenged conduct and for assessing damages under the assumption that the Plaintiffs prevail on their antitrust claims. I do not attempt to respond to every claim in the Amended Complaint or in the Elhauge Report. My lack of response to any particular claim does not indicate agreement.

10. A list of the materials that I considered in forming my opinions in this report is enclosed as Exhibit B.

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[5] Expert Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, Case No. 3:21-cv-03496-VC, December 2, 2022, ¶ 7.

[6] Expert Antitrust Merits Rebuttal Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, Case No. 3:21-cv-03496-VC, January 18, 2023; Expert Damages Rebuttal Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, Case No. 3:21-cv-03496-VC, January 18, 2023.

[7] Consolidated Amended Class Action Complaint, *In Re: da Vinci Surgical Robot Antitrust Litigation*, Lead Case No. 3:21-cv-03825-VC, September 10, 2021 ("Amended Complaint").

[8] Expert Report of Professor Einer Elhauge, *In Re: da Vinci Surgical Robot Antitrust Litigation*, Lead Case No. 3:21-cv-03825-VC, December 1, 2022 ("Elhauge Report").

11. The work presented in this report was conducted by me and staff at The Brattle Group working under my direction. The Brattle Group bills my time on this matter at $875 per hour. Neither my compensation nor the compensation of The Brattle Group depends in any way on the outcome of this case.

12. My work in this matter is ongoing. I reserve the right to supplement my analyses and conclusions should any additional information be provided to me after the submission of this report.

C. SUMMARY OF OPINIONS

13. I evaluate the Plaintiffs' claims based on the fundamental economic premise that vertical restraints (i.e., agreements between firms that operate at different levels of a supply chain), such as the challenged conduct here, can have procompetitive benefits and, in some circumstances, can cause anticompetitive harms. Hence, a proper analysis of the challenged conduct must explore whether the conduct causes any adverse competitive effects and, if so, whether those effects may be justified by demonstrable procompetitive benefits. My analysis leads me to the conclusion that Intuitive's challenged conduct has not caused anticompetitive harm and, instead, has resulted in significant procompetitive benefits.

14. More specifically, based on my analysis of the Elhauge Report, as well as my review of the record in this case, I have three main opinions:

- The challenged conduct encouraged, and continues to encourage, Intuitive to invest in significant medical advances that are designed to enhance patient safety and clinical outcomes.
  - In economics, the challenged conduct is understood to encourage innovations that benefit consumer health and wellbeing, especially when incentives to invest in such innovations can otherwise be dampened by opportunistic behavior, such as free-riding, by buyers and competitors.[9]

[9] A "free rider" is a "[c]onsumer or producer who does not pay for a nonexclusive good in the expectation that others will." A "nonexclusive good" is a "[g]ood that people cannot be

- Evidence indicates that Intuitive has been responsible for advances in surgical solutions that have improved clinical outcomes and patient wellbeing, and those important advances were made possible by Intuitive's significant and continued investments in the da Vinci Surgical System.
- In the absence of the challenged conduct, healthcare providers would have the incentive to engage in ex post opportunism, including engaging free-riding third parties who profit off of Intuitive's years of investments in the production of quality EndoWrist instruments by resetting instruments so that they can be resold to customers at lower prices than Intuitive's.[10] By preventing this opportunistic behavior, the challenged conduct encourages Intuitive to continue making investments that it otherwise likely would not make, at least to the same extent.

- As a matter of economics, the challenged conduct promotes lower overall pricing than would prevail in its absence.
  - It is well understood in economics that selling complementary components of a singular product together can cause prices to be lower than they otherwise would be.
  - Absent the challenged conduct, some healthcare providers would engage third parties to siphon off sales of EndoWrist instruments, which are an essential component of the da Vinci Surgical System. Any such forced unbundling of the strong complementarity between the da Vinci platform and EndoWrist instruments would erode the foundation on which Intuitive's value proposition to customers is built, which likely would cause prices to increase.
- Professor Elhauge's damages analysis significantly overstates any damages to the Plaintiffs.

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excluded from consuming, so that it is difficult or impossible to charge for its use." *See* Robert S. Pindyck and Daniel L. Rubinfeld, *Microeconomics, Eighth Edition* (New Jersey: Pearson Education, Inc., 2013), 690 and 693 ("Pindyck and Rubinfeld").
In the context of the case, third parties may take advantage of (or free ride on) Intuitive's investments without sharing in the costs. For more details, *see* Section VI.C.

[10] In understand that Intuitive alleges that third parties misrepresent the nature of their services. I refer to certain third party activities as "resets" or "services" for convenience only and express no opinion as to whether those terms accurately describe any work that third parties do.

15. These main opinions are based on several supporting opinions, as follows:

- *The da Vinci Surgical System is a singular product focused on optimizing patient safety and outcomes.*
  - The theoretical existence of separate economic markets for surgical robotic platforms specifically for use in soft tissue surgeries and EndoWrist repair and replacement results only from opportunistic actions of healthcare providers that engage with freeriding third-party companies to opportunistically reset EndoWrist instruments. Indeed, Intuitive designed these EndoWrist instruments from the outset so that they would not be used more than the number of times prescribed by Intuitive and cleared by the U.S. Food and Drug Administration ("FDA").
  - Intuitive designed the da Vinci Surgical System to achieve certain goals in patient safety and clinical outcomes, which depend on the high-quality performance of all of the system's independent components and services. The components are critical complements in achieving good clinical outcomes, ensuring an excellent record for patient safety, and protecting Intuitive's reputation and financial viability.
  - Intuitive's strategy for maintaining strict control over the components of its system has not changed since it had almost no sales. Since at least 1999 when Intuitive began selling its first-generation system, Intuitive has sold the da Vinci Surgical System, including the robotic platform, instruments, and service, together through a single contract with its customers.
  - It is economically meaningful that other medical device manufacturers similarly sell their systems as singular products. For example, other, less prolific robotic surgical systems are marketed as a singular product.
  - Although I do not necessarily agree with the "rule of thumb" set forth by Professor Elhauge and his coauthors, Professor Elhauge provides no convincing analysis to show that even his rule of thumb would indicate that the components of the da Vinci Surgical System should be considered "separate" from an economic standpoint.

- *Plaintiffs' asserted "minimally invasive surgical robot" ("fore") market should include laparoscopic and other surgical solutions.*[11] Even if one were to ignore the fact that Intuitive never has sold its robotic platform separately from the other components of the da Vinci Surgical System, a hypothetical market that includes da Vinci platforms should also include laparoscopic and open surgery.
  - The proper economic framework under which Intuitive's alleged monopoly power[12] in Plaintiffs' asserted "fore" market should be evaluated involves an assessment of whether Intuitive faces competition sufficient to ensure its incentives to price and innovate competitively.
  - Surgical solutions are what economists refer to as "differentiated products"—i.e., surgical solutions are substitutes for one another but have different product attributes. It is well-known in economics that products can be in the same economic market even when they are differentiated from one another.
  - The record is clear that Intuitive's main focus when selling its da Vinci Surgical System is to convince as many hospitals as possible to buy its system, and the primary competitive constraints to Intuitive in this endeavor are traditional laparoscopic and open surgeries.
  - Professor Elhauge misapplies several principals of market definition to support his conclusion that laparoscopic and other surgical systems should be excluded from relevant markets where the da Vinci Surgical System competes. For example,
    - Professor Elhauge cites testimony of multiple hospitals indicating that they would not switch away from the da Vinci Surgical System if Intuitive were to raise prices by a

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[11] I use the term "surgical solution" to refer to a set of tools and/or techniques to perform a surgical procedure. *See*, e.g., Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2021 ("Intuitive 2021 Form 10-K") at p. 6 ("Intuitive brings nearly three decades of experience and technical innovation to our robotic-assisted surgical **solutions**.") (emphasis added) and Medtronic plc Form 10-K For the Fiscal Year Ended April 30, 2021 at p. 3 ("Medtronic plc, headquartered in Dublin, Ireland, is among the world's largest medical technology, services, and **solutions** companies.") (emphasis added).

[12] I use the term "monopoly power" to encompass coercive market power that is significant enough to cause anticompetitive harm.

significant amount—an assertion that is inapposite to the relevant market definition inquiry and, if anything, is inconsistent with Intuitive pricing like a monopolist.

- Professor Elhauge confuses observed asymmetric switching from traditional surgical systems to the da Vinci Surgical System over time with asymmetric economic substitution. There can be observed asymmetric switching in the presence of significant ongoing competition, as evidence indicates is the case here between the da Vinci Surgical System and more traditional surgical modalities such as laparoscopic surgery.

- As a result of his incorrect market definitions, Professor Elhauge presents "market shares" that are significantly inflated and uninformative as to Intuitive's competitive conduct.

- *Intuitive's pricing and margins in Plaintiffs' asserted da Vinci service and EndoWrist replacement and repair "after markets" do not reflect the abuse of monopoly power.* The Plaintiffs and Professor Elhauge argue that Intuitive's prices for EndoWrist instruments are "high." As a general matter of economics, in a market where there is differentiation across product offerings, it is difficult to learn much from a static evaluation of price levels.[13] Moreover, it also is well understood to economists that a static evaluation of prices and margins as a measure of monopoly power is inappropriate where innovator firms take big risks with uncertain investments, as Intuitive has done over the past 25 years. A more informative analysis evaluates the extent to which a firm charges higher prices where it would appear to have more significant market power. In this case,:
  - Intuitive's prices for da Vinci platforms have not increased over time as its sales have grown.
  - Intuitive's prices for EndoWrist instruments have not increased over time as its sales have grown.

[13] A "static evaluation of price levels" is an analysis of pricing at a given point in time. For example, the calculation of price over marginal cost in a given year (or over a short time period of a few years) is a static evaluation of price levels.

- Intuitive's prices for EndoWrist instruments do not systematically vary across customers, regardless of the extent of their utilization of the da Vinci Surgical System.
- Intuitive's prices for system servicing have not increased over time as sales of the da Vinci Surgical Systems and its components have grown.
- Intuitive's prices for system servicing do not systematically differ across customers regardless of utilization of the da Vinci Surgical System.
- These empirical facts confirm that Intuitive continues to face similar competitive constraints today as it did when it entered the broad market for surgical solutions more than 20 years ago.
- Professor Elhauge's assessment of Intuitive's prices and margins is inapt.
  - To support his opinion that Intuitive's prices are "high," Professor Elhauge compares Intuitive's prices to several purported "yardsticks." However,
    - As a general matter of economics, in markets where differentiated products such as the da Vinci Surgical System compete, there is no reason why Intuitive's price levels should be the same as other differentiated products, even if the products are in the same relevant antitrust market.
    - Professor Elhauge's "yardsticks" are not comparable to the analogous components of the da Vinci Surgical System.
    - Professor Elhauge's analysis implicitly assumes that the components of the da Vinci Surgical System are priced independently, which they are not.
  - To support his conclusions on market power, Professor Elhauge uses price-cost margins that fail to reflect important aspects of Intuitive's costs and competitive conduct—significant investments under significant uncertainty.

- *Intuitive's conduct has legitimate business justifications.* To the extent Intuitive's conduct has the potential to cause anticompetitive harm—which, again, it does not—any such effect should be considered against legitimate business reasons for the conduct, as to which Intuitive has many.
  - As a matter of economics, there are many procompetitive rationales for grouping components of a product together for sale (or "bundling"). These include lowering

transaction and compatibility costs for customers, protecting intellectual property ("IP"), and pricing efficiently to increase product demand.

- The economic evidence indicates that selling its da Vinci Surgical System as a singular product has allowed Intuitive to maintain control over the quality of the service its system provides, which improves clinical outcomes and protects patient safety. Intuitive's commitment to clinical outcomes and patient safety is not purely philanthropic; these performance metrics are crucial to Intuitive's financial viability.
- Professor Elhauge acknowledges Intuitive's significant investments in the da Vinci Surgical System, but ignores the mechanism by which the challenged conduct fostered those investments. That is, by protecting Intuitive's IP and fostering patient safety, the challenged conduct has promoted procompetitive investments in the da Vinci Surgical System.
- Intuitive's challenged conduct also has allowed it to offer customers a superior financial deal relative to what they likely would receive if Intuitive was forced to unbundle its product.

- *Attempts by third-party companies to sell reset instruments reflect an interest in free-riding—rent extraction, not competition*. Professor Elhauge's analysis assumes that the third-party companies are competitors who developed and sell a product that is comparable to the services offered by Intuitive—when, in fact, the third parties are extracting rents from Intuitive's intellectual property and reputation—classic free riding.
- *Professor Elhauge's damages analysis fails to consider a proper but-for world and suffers from other key methodological flaws.*
  - As noted above, the forced unbundling of the complementary components of the da Vinci Surgical System likely would cause Intuitive to alter its pricing strategy (e.g., increasing the price of the da Vinci platform and decreasing the price of EndoWrist instruments and system servicing). From an economic perspective, this likely would cause overall pricing to be higher for some customers and overall demand for the da Vinci Surgical System to be lower than in Professor Elhauge's posited but-for world. The implication is that damages would be lower (potentially even negative) than Professor Elhauge claims.

- In addition to incorrectly assuming there is no complementarity across the components of the da Vinci Surgical System, Professor Elhauge provides no meaningful economic analysis of Intuitive's likely strategic pricing decisions in his posited but-for world. Evidence shows that customers perceive new EndoWrists sold by Intuitive to be significantly differentiated from EndoWrists that are reset by third parties. Hence, ignoring complementarity with the surgical platform, as Professor Elhauge implicitly does, it is plausible that in the relevant but-for world Intuitive's optimal response to the presence of third-party EndoWrist resets would be to *increase* prices for new EndoWrists. This would cause some hospitals to be worse off in the relevant but for world (i.e., they would experience negative damages) and likely would lower overall damages relative to Professor Elhauge's calculations.
- Professor Elhauge disregards the impact of FDA clearance on the demand for third-party EndoWrist instrument resets. Evidence shows that some hospitals and surgeons are hesitant or even unwilling to use instruments that are not cleared by the FDA. Professor Elhauge has not performed an economic analysis assessing the extent to which any hospitals would purchase reset instruments that have not been cleared.
- Professor Elhauge's start date of May 21, 2017 for his damages calculations is not supported by the evidence in this case, and thus Professor Elhauge's assumption that any price discount and/or increase in the use limit would occur on May 21, 2017 is unreliable and overly aggressive.
- Professor Elhauge assumes that, in the relevant but-for world, third parties would have been able to reset X/Xi EndoWrists. However, evidence indicates that third parties have not yet been able to do so. Professor Elhauge's classwide damages for instruments are reduced by 79 percent when instruments that third parties do not or have not reset are excluded.
- Professor Elhauge's assumption that EndoWrists can be used 20 times is unfounded. All of Intuitive's EndoWrists have undergone extensive testing and have been cleared by the FDA for a prescribed number of uses. Even Intuitive's new extended use program only was able to increase use limits for a small subset of X/Xi instruments to 12-18 uses after significant testing.

- Without any recognized economic analysis, Professor Elhauge posits a but-for world where Intuitive would give a 20 percent price discount *and* double its use limits. The effective price discount in Professor Elhauge's scenario would be larger (which would lead to higher damages) than his own "benchmarks," such as the observed price discounts offered by third-party companies.

- Professor Elhauge applies a 24 percent price discount to all da Vinci services even though he acknowledges that there are what he calls "incontestable" da Vinci services that cannot be provided by third-party companies without Intuitive's proprietary tools. Again, Professor Elhauge does no economic analysis of Intuitive's likely strategic responses in his assumed but-for world. For example, he does not consider the possibility of Intuitive unbundling its "contestable" and "incontestable" services in the but-for world and increasing its prices on system servicing, particularly for "incontestable" services. This would reduce or possibly eliminate the Plaintiffs' purported damages associated with servicing.
- Professor Elhauge claims to use a "yardstick" approach to estimate Intuitive's but-for world pricing for system servicing, but his "yardsticks" are not comparable to Intuitive. His approach also suffers from several methodological errors that cause his estimates to be unreliable.
- Setting aside the many conceptual flaws in Professor Elhauge's damages analysis, I find that adjusting for these computational errors alone reduces the total purported classwide damages to approximately 20 percent of Professor Elhauge's estimates.

II. BACKGROUND

16. From the outset, Intuitive "[designed] and [manufactured] the da Vinci Surgical System" to "[represent] a new generation of surgery" after open surgery and minimally invasive surgery ("MIS") that would benefit patients and surgeons.[14] As I discuss below, over the next 25 years, Intuitive not only developed and commercialized robotic-assisted surgery ("RAS") for soft tissue

[14] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2000 ("Intuitive 2000 Form 10-K") at p. 1.

surgery, but Intuitive has also continued to innovate and advance its technology to achieve its mission of improving patient care and safety and of enabling surgeons to increase access to minimally invasive care.[15]

A. KEY PARTICIPANTS IN MARKETS FOR SURGICAL SOLUTIONS

17. Markets for surgical solutions involve a number of participants that interact with each other in various ways. Four key participants are patients, surgeons, healthcare facilities (such as hospitals or ambulatory surgical centers), and medical equipment suppliers.

18. *Patients* receive surgical (or other medical) treatment to address a health condition, such as gallstones in one's gallbladder or bile duct. Their health and wellbeing are directly impacted by the outcome of the surgery, which includes both short-run effects (such as pain and fatigue) and long-run effects (such as prolonged complications).[16] Patients and their families choose from among their treatment options, which may include different surgical techniques as well as alternatives to surgery, and often rely on expert knowledge from their physicians, surgeons, and/or care teams.[17]

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[15] DeSantis (in *Rebotix*) Dep. Tr. 59:3-9 ("A. …You know, the company believes in putting patients first, providing technologies to surgeons that will help them help patients. So that's been our strategy, and that's been our mission. In doing that, you know, we've spent a lot of time and money and -- and effort and -- and developed the soft tissue robot."). *See also* Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2021 ("Intuitive 2021 Form 10-K") at p. 6 ("Intuitive is committed to advancing minimally invasive care through a comprehensive ecosystem of products and services. This ecosystem includes systems, instruments and accessories, learning, and services connected by a digital portfolio that enables precision and control, seamless interactions and experiences, and meaningful insights to drive better care.").

[16] "Side Effects of Surgery," Cancer.Net, accessed January 5, 2023, https://www.cancer.net/navigating-cancer-care/how-cancer-treated/surgery/side-effects-surgery; Anna Pinto et al., "Surgical complications and their impact on patients' psychosocial well-being: a systematic review and meta-analysis," *BMJ Open* (2016): 1-23.

[17] "Computer-Assisted Surgical Systems," U.S. Food and Drug Administration, accessed January 5, 2023, https://www.fda.gov/medical-devices/surgery-devices/computer-assisted-surgical-systems (Under "Recommendations for Patients and Health Care Providers about Robotically-Assisted Surgery:" "Robotically-assisted surgery is an important treatment

19. *Surgeons* are trained healthcare professionals who are responsible for "the preoperative diagnosis of the patient, for performing the operation, and for providing the patient with postoperative surgical care and treatment."[18] They typically specialize in a specific field, such as urology or gynecology.[19] Surgeons perform surgeries at healthcare facilities (such as hospitals) where they have privileges.[20] Some surgical techniques or procedures require additional training, which may involve specialized residency programs.[21] Based on their expertise, surgeons often make recommendations to patients on surgical options for treatment and decisions on how to perform a surgery.[22] Surgeons will discuss "comparative risks and benefits" of different treatment options,

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option but may not be appropriate in all situations. Talk to your physician about the risks and benefits of robotically-assisted surgeries, as well as the risks and benefits of other treatment options."); "Gynecologic Surgery," Valley Medical Center, accessed January 11, 2023, https://www.valleymed.org/services/all-specialties/obgyn-services/gynecologic-surgery (Under "Robotic-Assisted Hysterectomy": "For most patients, robotic-assisted surgery can offer numerous potential benefits over traditional approaches to vaginal, laparoscopic or open abdominal hysterectomy, particularly when performing more challenging procedures like radical hysterectomy for gynecologic cancer…While radical hysterectomy or abdominal hysterectomy performed using a robotic system are considered safe and effective, these procedures may not be appropriate for every individual. Always ask your doctor about all treatment options, as well as their risks and benefits."); Franciscan-00055779 at -782 ("Hernia surgery can be done multiple ways, including minimally-invasive robotic surgery and laparoscopic surgery, as well as traditional open surgery. Not every patient is a candidate for minimally-invasive surgery. Your doctor will need to determine which procedure is best for you.").

[18] "What is the job description for surgeons?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/job-description.

[19] "What are the surgical specialties?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/specialties.

[20] "Statement on Credentialing and Privileging and Volume Performance Issues," American College of Surgeons, April 1, 2018, accessed January 5, 2023, https://www.facs.org/about-acs/statements/111-credentialing ("Privileging designates the specific surgical conditions and procedures that a surgeon will be allowed to manage and perform at a health care institution.").

[21] "How many years of postgraduate training do surgical residents undergo?" American College of Surgeons, accessed January 55, 2023, https://www.facs.org/education/resources/medical-students/faq/training.

[22] "What is the job description for surgeons?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/job-description ("The surgeon is responsible for the preoperative diagnosis of the patient, for performing the

including different surgical modalities, with their patients.[23] Health insurers and patients typically pay "professional fees" to surgeons for their services.[24]

20. *Healthcare facilities*, such as hospitals and ambulatory surgery centers, are locations where healthcare services, including surgeries, are provided. To build out the facilities' capabilities and service offerings, healthcare facilities may make capital purchase decisions for, as examples,

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operation, and for providing the patient with postoperative surgical care and treatment. The surgeon is also looked upon as the leader of the surgical team. During the course of an operation, the surgeon must make important decisions about the patient's health, safety, and welfare."); "Statements on Principles," American College of Surgeons, accessed January 5, 2023, https://www.facs.org/about-acs/statements/stonprin ("Because a team of specialists undertakes much of modern patient care, nonsurgeon physicians often may conduct the initial evaluation of patients. However, the surgeon bears the ultimate responsibility for determining the need for and the type of operation. In making this decision, the surgeon must give precedence to sound indications for the procedure over pressure by the patients or referring physicians or the financial incentive to perform the operation.").

[23] *See*, e.g., Bernier (11/7/2022) Dep. Tr. 19:20-19:24 ("Q. When you are obtaining informed consent from your patients, do you explain to them the comparative risks and benefit of different surgical modalities? A. Yes.") and Burke (9/27/2022) Dep. Tr. 24:16-25:25 ("Q. Would you ever seek patient input in deciding which surgical modality to use? A. Yes, we would give them options if they -- if they desired that. Q. So sometimes you would give a patient the option to choose between laparoscopic surgery or surgery using the Da Vinci? A. Well, most operations, we give the patient an opportunity to decide some of that, but as a rule we give them our best recommendation of which would be the most efficient. Q. And why are you looking for a procedure that would be most efficient? A. Well, it's easier -- anything that's easier on the patient is kind of the out- -- we're looking for outcome here. So you want them to be comfortable and experience the least pain with the fastest recovery. Q. Was cost ever a factor in determining which modality you would use? …[A.] Yes, I mean, that's why most of the gallbladder surgery was done laparoscopically versus robotically. Couldn't get the cost down."). *See also* Francis (10/14/2022) Dep. Tr. 13:17-15:12.

[24] "Understanding your hospital bill," MedlinePlus, accessed January 5, 2023, https://medlineplus.gov/ency/patientinstructions/000881.htm ("A hospital bill will list the major charges from your visit. It lists the services you received (such as procedures and tests), as well as medicines and supplies. Most of time, you will get a separate bill for health care provider fees."). *See also* "Professional versus facility billing: What hospitalists must know," Larry Beresford, June 15, 2021, accessed January 5, 2023, https://www.the-hospitalist.org/hospitalist/article/241539/mixed-topics/professional-versus-facility-billing-what-hospitalists-must.

diagnostic or surgical equipment.[25] Healthcare facilities charge insurers and patients facility fees (that are separate from professional fees) for procedures performed at the hospital or center.[26]

21. *Medical equipment suppliers* design, manufacture, and sell medical devices. Suppliers often market to patients, surgeons, and healthcare providers as well as surgeons.[27] Healthcare facilities are usually the direct purchaser of the equipment while surgeons often have influence with patients in the decision over treatment choice as well as the facilities' purchasing decisions.[28]

B. THE EVOLUTION OF SURGICAL SOLUTIONS FOR SOFT TISSUE SURGERY

22. Prior to the commercialization of RAS techniques for soft tissue surgery, patients had the options of open surgery and MIS as treatment:[29]

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[25] Intuitive-00285709 ("Trinity Health FY 17 Capital Guidance") at -711 and -714. One of the guiding Capital Management Principles of Trinity Health's FY Capital Guidance is "[c]apital requests that improve the quality of care, grow the business and strengthen the financial health of the Ministry will have the highest priority." Trinity Health allocates capital to a "Strategic/Growth" category to "expand or protect a Ministry's market position, create a distinct competitive advantage, enhance services to physicians and patients, increase volume, and improve service line profitability." *See also* "About Us," Trinity Health, accessed January 5, 2023, https://www.trinity-health.org/about-us/ ("Trinity Health is one of the largest not-for-profit, Catholic health care systems in the nation. It is a family of 123,000 colleagues and nearly 27,000 physicians and clinicians caring for diverse communities across 26 states. Nationally recognized for care and experience, the Trinity Health system includes 88 hospitals, 135 continuing care locations, the second largest PACE program in the country, 136 urgent care locations and many other health and well-being services.").

[26] *See* fn. 24 above.

[27] Intuitive-00015458 at -462. *See also* Intuitive-00002138.

[28] Intuitive-00356654 at -657. According to this Intuitive document, physicians and surgeons influence the customer timeline for buying capital. *See also* "How do hospitals make Purchasing Decisions?" Cleve Holden, accessed January 11, 2023, https://www.linkedin.com/pulse/how-do-hospitals-make-purchasing-decisions-cleve-holden ("A wide range of individuals may take part in determining whether a hospital buys a certain product….Physicians tend to be mainly interested in maximizing treatment effectiveness and improving the patient experience, but a range of other interests come into play.") and ¶ 19 above.

[29] Intuitive-00595673 at -677 and -678. *See also* Intuitive 2000 Form 10-K at pp. 2-4.

a. Open surgery involves "[creating] an incision large enough to allow a direct view of the operating field and the insertion of at least two human hands to manipulate the patient's tissues."[30] Open surgery has been performed at least since the early 19th century and was revolutionized with the advent of anesthesia and antisepsis in the second half of the 19th century.[31] Although open surgery has advantages such as precision (given the "extremely wide range of motion" of the human hand) and ease for the surgeon, the large incision can "create very significant trauma to the patient, resulting in long hospitalization and recovery times, high hospitalization costs, as well as significant pain and suffering."[32]

b. MIS includes surgical techniques that are performed through small incisions or "ports."[33] There are further divisions of techniques within MIS, such as laparoscopy, endoscopy, and colonoscopy.[34] In particular, technological advances in laparoscopes spurred laparoscopic surgical techniques in the United States in the 1930s.[35] The development of video laparoscopes in the late 1970s and early 1980s, which some researchers deem as the "single most important technological advancement for complex laparoscopic surgery," led to further

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30 Intuitive 2000 Form 10-K at p. 2. *See also* "Methods of Surgery," Johns Hopkins Medicine, accessed January 5, 2023, https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/methods-of-surgery ("Johns Hopkins Medicine").

31 Atul Gawande, "Two Hundred Years of Surgery," *The New England Journal of Medicine* 366 (2012): 1716-1723.

32 Intuitive 2000 Form 10-K at p. 2. *See also* "Exploring Surgery Options: Open vs. Minimally Invasive," Beaumont, accessed January 5, 2023, https://www.beaumont.org/health-wellness/blogs/exploring-surgery-options-open-vs-minimally-invasive.

33 Intuitive 2000 Form 10-K at pp. 2-3. *See also* John Hopkins Medicine.

34 Laparoscopy is a "minimally invasive procedure in the belly cavity that uses a tube with a light and camera lens at the end (laparoscope) to examine organs and check for abnormalities." Endoscopy is a "test that uses a small, flexible tube with a light and a camera lens at the end (endoscope) to examine the inside of the hollow organs of the digestive tract." Colonoscopy is the "[e]valuation of the entire colon using an endoscope." *See* John Hopkins Medicine.

35 William Kelley, "The Evolution of Laparoscopy and the Revolution in Surgery in the Decade of the 1990s," *Journal of the Society of Laparoendoscopic Surgeons* 12, No. 4 (2008): 351 ("Kelley").

uptake of the technique in the 1980s and 1990s.[36] Laparoscopic surgery's advantages for the patient over open surgeries include "decreasing blood loss, pain, and discomfort" as well as lowering postoperative complications and reducing recovery time.[37]

23. As laparoscopic surgeries gained popularity in the 1980s and 1990s, it became apparent that the technique "worked well for relatively simple surgical procedures" but was not widely adopted for "applications requiring complex reconstruction."[38] These limitations of laparoscopic surgeries provided an opportunity for RAS. In late 1980s and early 1990s, several groups located across various universities and laboratories researched ways to "marry telerobotic technologies with minimally-invasive surgical techniques" that could address the "challenges that were being experienced" in MIS laparoscopic methods.[39] One group consisted of Phil Green at SRI International, surgeons at Stanford University, and Dr. John Bowersox.[40] SRI International would later license its "telepresence surgery technology" to Intuitive in 1995.[41]

C. INTUITIVE'S INNOVATION AND MARKETPLACE COMPETITION

24. Intuitive was founded in 1995 with a vision to "commercialize a fundamentally new generation of technology for [MIS]."[42] The company sold its first da Vinci Surgical System in 1998 and obtained FDA clearance in the U.S. in 2000.[43] Since its first sale, the number of da Vinci

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[36] Kelley at pp. 352-353. *See also* Intuitive-00270554 at -556.

[37] Riaz Agha and Gordon Muir, "Does Laparoscopic Surgery Spell the End of the Open Surgeon?" *Journal of the Royal Society of Medicine* 96, No. 11 (2003): 544.

[38] Intuitive-00270554 at -556.

[39] Intuitive-00270554 at -556 and -557.

[40] Intuitive-00270554 at -557.

[41] Intuitive-00270554 at -558; Intuitive-00595673 at -675.

[42] Intuitive-00595673 at -675.

[43] Intuitive-00270554 at -558. Note that the first sale of the da Vinci Surgical System was 1998, and Intuitive "began marketing the *da Vinci* System in Europe in 1999" (at -558). In its 10-K filings, Intuitive reports that the launch of the system was 1999 (e.g., Intuitive 2020 Form 10-K at p. 4).

Surgical System placements grew to 6,730 worldwide as of 2021.[44] While the number of da Vinci surgical procedures has also grown by more than 6-times (or 600 percent) between 2009 and 2021, evidence shows that da Vinci procedures still represent a small minority of surgical procedures.[45]

25. Below, I summarize the historical and ongoing development of Intuitive's surgical systems (i.e., the da Vinci Surgical Systems) and the company's initial and ongoing efforts to compete with open and laparoscopic surgical techniques.

1. The Historical and Ongoing Development of Intuitive's Surgical Systems

a. Intuitive's innovations have been focused on patient safety and improved outcomes

26. Intuitive's innovations focus on "advancing patient care in surgery" by "[improving] the quality of and access to minimally invasive care."[46] When Intuitive formed in 1995, it recognized that there were limitations to laparoscopic surgery techniques—such as "[n]on-intuitive [i]nstrument

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[44] Intuitive 2021 Form 10-K at p. 12.

[45] 6.74 = (1,594,000 – 206,000) / 206,000. The number of procedures worldwide in 2009 was approximately 206,000 (Intuitive 2010 Form 10-K at p. 44). The number of procedures in 2021 was approximately 1,594,000 worldwide (Intuitive 2021 Form 10-K at p. 63). *See also,* Public Data Workpaper.

Medtronic and TransEnterix (now known as Asensus Surgical) advertise that "[r]obotic [p]enetration" in the surgical procedures is less than 5 percent. *See* "Company Fact Sheet," Asensus Surgical, accessed January 5, 2023, https://asensus.com/sites/default/files/media-kit/Asensus%20Fact%20Sheet%20-%202021.pdf at p. 2; "Robotic-Assisted Surgery (RAS) Analyst Update," Medtronic, September 24, 2019, accessed January 12, 2023, https://investorrelations.medtronic.com/download/MDT+RAS+Investor+Update+09242019.pdf at p. 19.

See also Kyle H. Sheetz, Jake Claflin, and Justin B. Dimick, "Trends in the Adoption of Robotic Surgery for Common Surgical Procedures," *JAMA Network Open* 3, No. 1 (2020): 1-2. Researchers at University of Michigan School of Medicine found that, across procedures, use of robotic surgery increased from 1.8 percent in 2012 to 15.1 percent in 2018 among 73 Michigan hospitals that account for over 90 percent of surgical volume in the state.

[46] Intuitive 2020 Form 10-K at p. 4.

[m]ovements," "[l]imited [d]egrees of [f]reedom," "[p]oor [s]ensory [f]eedback," and "[n]on-intuitive [v]isualization"—that prevented the benefits of MIS from reaching more patients and care teams.[47] In the process of developing the first da Vinci Surgical System, engineers at Intuitive created two prototypes that, while demonstrating the concept of RAS, fell short on certain dimensions such as poor visualization, fragility, and unreliable instrument engagement.[48] In the words of Intuitive's Chief Product Officer (Bob DeSantis), Intuitive has "a rank order of priorities, and it's patients first."[49]

27. The da Vinci Surgical System includes "a surgeon's console, a patient-side cart, a high performance vision system and [Intuitive's] proprietary instruments."[50] The surgeon's console is the place from which the surgeon "control[s] the motion of the surgical instruments that are situated at the patient side, as well as observe[s] video images from inside the patient."[51] The patient-side cart is positioned next to the operating bed, and Intuitive's proprietary surgical instruments (including EndoWrist instruments) are attached to arms on the patient-side cart.[52] The vision system provides a high resolution, 3-D image of the patient's interior.[53] Intuitive's proprietary instruments and accessories include EndoWrist instruments, which have "a wrist

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47 Intuitive-00595673 at -678 and -679.

48 Intuitive-00270554 at -560 through -563. Intuitive's Lenny SRI prototype was "not reliable—it was fragile—and the visualization provided by the combination of the Welch Allyn endoscope and the CrystalEyes display system was poor." Intuitive's Mona prototype suffered from "sensitiv[ity] to mechanical tolerances and lead to unreliable instrument engagement[,]" a "counterbalancing mechanism [that] proved to be unstable and inflexible," and unclear and uncomfortable stereo viewing of the surgical field due to insufficient image acquisition and display quality.

49 DeSantis (in *Rebotix*) Dep. Tr. 148:17-20 ("A. So we have a rank order of priorities, and it's patients first. Physicians, hospitals, employees, and investors are last. But we -- we try and – we try and benefit all of them.").

50 Intuitive 2000 Form 10-K at p. 1. As a shorthand in my report, I refer to the surgeon's console, patient-side cart, and vision cart as the "da Vinci platform."

51 Mahdi Azizian et al., "The da Vinci Surgical System," in *The Encyclopedia of Medical Robotics*, ed. Rajni Patel (New Jersey: World Scientific, 2018), 7 ("Azizian et al.").

52 Intuitive 2000 Form 10-K at p. 6.

53 *Id.*

joint for natural dexterity" and come in a variety of end effectors (such as forceps and scissors).[54] The surgical care team can use the instruments interchangeably during the procedure.[55] Each EndoWrist instrument has a limited number of uses to ensure that "its performance meets specifications during each procedure."[56]

28. Since the 1990s, Intuitive has continued to innovate on the da Vinci Surgical System on multiple dimensions, and I highlight three examples here. First, the company has released four generations of the robotic platform: the original da Vinci Surgical System (sometimes referred to as the "Standard") in 1998, the da Vinci S system in 2006, the da Vinci Si system in 2009, and the da Vinci Xi system in 2014.[57] These platforms improve on capabilities such as the range of procedures that can be performed.[58] Second, the company has developed a wide variety of instruments to enhance the system's capabilities and improve on precision.[59] Intuitive has also improved on the material of the instruments to increase durability and reduce instrument failures during operations.[60] Third, Intuitive has developed different financing arrangements for its

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54 *Id.*

55 *Id.*

56 *Id.*

57 "Sustainability Report 2020," Intuitive Surgical, Inc., accessed January 5, 2023, https://isrg.gcs-web.com/static-files/15edd98b-4896-4bd7-a3b4-e2f095a61a61 at pp. 6-7 ("Intuitive 2020 Sustainability Report"). In addition, Intuitive launched the da Vinci X system in 2017 and da Vinci SP system in 2018 (Intuitive 2020 Sustainability Report at p. 7).

58 Intuitive 2020 Sustainability Report at pp. 6-7. In addition to receiving additional clearance for surgical procedures from the FDA, each generation improved the capabilities of the da Vinci Surgical System including 3DHD vision in 2007, EndoWrist Vessel Sealer and Firefly fluorescence imaging in 2011, and improvements to instruments and accessories.

59 "Da Vinci Xi Single-Site Technology: Solutions for Single-Incision Surgery," Intuitive Surgical, accessed January 11, 2023, https://www.intuitive.com/en-us/-/media/Project/Intuitive-surgical/files/pdf/1025290ra-isi-brochure-single-site-digital-low-res-394110.pdf?la=en&hash=F24EC0B5DB9C62BDD688F77409A3CA50. For example, the da Vinci Xi 8mm endoscope provides the surgeon a clearer view of the surgical field. FireFly fluorescence imaging is integrated to highlight specific tissues such as vessels and bile ducts" (at p.7). Some of the advantages of this endoscope include brighter image, higher resolution, and longer endoscope improving the Xi system's capabilities.

60 Intuitive 2020 Sustainability Report at p. 12 ("To maximize customer benefits, we identified the most frequently used instruments by examining instrument usage data from millions of

customers, such as leasing and usage-based pricing.[61] By offering flexibility in the financing arrangements, Intuitive and its customers are able to increase access to the technology for patients.[62]

29. Alongside its goal of improving on patient care and safety, Intuitive provides surgeons with "reliable and easy-to-use products" through its system design that allows for more natural surgeon movement, better ergonomics, and the reduction of tremors when compared with conventional MIS techniques such as traditional laparoscopy.[63] Intuitive's technology minimizes the invasiveness of RAS by "[transforming] the surgeon's natural hand movements outside of the body into corresponding micro-movements inside the patient's body" and "allow[ing] precision and control for delicate tasks."[64] These benefits to the surgeon also are designed to help to ensure better surgical outcomes for the patient.[65]

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worldwide surgical procedures. Product teams enhanced instrument design, materials, manufacturing process, and testing protocols to improve instrument reliability over time. The teams addressed common reprocessing challenges, incorporating new design safeguards that improved durability."). *See also* DeSantis (in *Restore*) Dep. Tr. 53:1-12 (Q. …Had you personally observed improvements in the quality and durability of the Xi instruments? A. Yes. Depending on what you mean by did I personally observe it; but uh-huh. Q. …Had you personally seen return rates or other data to show that there were improvements in the quality and durability of the Xi instruments? A. Yes."); Vavoso (in *Rebotix*) Dep. Tr. 210:22-25 ("[A.] I can't give you a specific [design improvement that Intuitive implemented in response to RMAs from its consumers], but we are constantly innovating, looking to make those instruments more robust. …[C]onstant innovation goes on with the instrument.").

61 Intuitive 2021 Form 10-K at p. 36 ("Certain of our leasing arrangements allow customers to cancel, return, or upgrade the systems leased prior to the end of the lease term without incurring a financial penalty. We also lease our systems to certain qualified customers where the lease payments are based on their usage of the systems.").

62 *See* ¶ 225 below.

63 Intuitive 2021 Form 10-K at pp. 7, 10.

64 Intuitive 2021 Form 10-K at p. 7.

65 Intuitive 2021 Form 10-K at p. 55 ("For over three decades, MIS has reduced trauma to patients by allowing selected surgeries to be performed through small ports rather than large incisions…. Da Vinci Surgical Systems enable surgeons to extend the benefits of MIS to many patients who would otherwise undergo a more invasive surgery by using computational, robotic, and imaging technologies to overcome many of the limitations of

b. Intuitive complies with strict health and safety regulations

30. From its inception, Intuitive has had to comply with strict health and safety regulations in all geographies where it sells the da Vinci Surgical System.[66] For example, in the U.S., Intuitive must obtain clearance from the Food and Drug Administration ("FDA") by procedure type to market the da Vinci Surgical System for use.[67] As part of the clearance process, Intuitive submitted "extensive testing data to the FDA" and "performance specifications."[68] Post-clearance, the FDA performs "routine audits of companies" and "post market surveillance… activities" in which the FDA will "ask for testing and data."[69] The process to achieve FDA

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traditional open surgery or conventional MIS…. In designing our products, we focus on making our technology easy and safe to use.").

66 Intuitive 2021 Form 10-K at pp. 14-15 ("Our products and operations are subject to regulation by the FDA, the State of California, and countries or regions in which we market our products. In addition, our products must meet the requirements of a large and growing body of international standards, which govern the design, manufacture, materials content and sourcing, testing, certification, packaging, installation, use, and disposal of our products.").

67 Vavoso (in *Rebotix*) Dep. Tr. 86:6-11 ("A. It's that you receive a -- an approval to apply that technology to a given procedure type. So not every system out there can be compared to every system in terms of its applicability. One might have a more narrow applicability based on FDA approval. One might have a broader."). *See also* "Robotic-Assisted Surgery with da Vinci Systems," Intuitive, accessed January 17, 2023, https://www.intuitive.com/en-us/patients/da-vinci-robotic-surgery ("Da Vinci surgical systems are cleared by applicable regulatory agencies for use in several types of surgery.") and Azizian et al. at p. 5 ("This first FDA clearance was for applications in general surgery; however, additional indications for thoracoscopic (chest) and radical prostatectomy procedures followed one year later.").

68 Rosa (in *Restore*) Dep. Tr. 42:11-43:2 ("Q. As part of that process, does Intuitive provide its own testing data for the Endowrist instruments to the FDA? A. As part of the clearance process? Q. Yes. A. We provide extensive testing data to the FDA, yes. Q. As part of that clearance process, does Intuitive also disclose performance specifications for the Endowrist instruments to the FDA? A. I'm almost certain that our -- our requirements documents or the specifications as you're talking about them are part of that package.").

69 Rosa (in *Restore*) Dep. Tr. 39:19-40:14 ("Q. …Once the FDA has cleared a medical device for marketing and sale by Intuitive, does the FDA review and audit additional tests of the cleared device after clearance? …A. So they -- they perform routine audits of companies. Within those audits they will review a whole host of material, some of which could very well be testing of instruments. There is also a whole post market surveillance set of activities that the FDA conducts. And many, many times as part of those activities and interactions with

clearance for the surgical system "could be up to… a 10-year journey."[70] As summarized in the testimony of an executive at Intuitive (Glenn Vavoso), the "long development time is an outcome of various process points that you need to bring a medical device product to market that is safe for physicians to use with their patients."[71]

c. From the outset, Intuitive tested its surgical system to ensure patients realize optimal outcomes

31. Intuitive performs extensive testing to ensure the quality of its products, including the EndoWrist instruments, and its testing protocol has multiple facets.[72] For example, Intuitive performs life testing and statistical modeling of the EndoWrist instrument lives.[73] Intuitive set specification

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companies, they'll ask for testing and data. There may be other circumstances. But those are two that come to mind.").

[70] Vavoso (in *Rebotix*) Dep. Tr. 132:24-133:2 ("[A.] You know, what I would say is that the entire development process to achieving FDA approval, then being able to market a system -- or a system could be up to, you know, a 10-year journey.").

[71] Vavoso (in *Rebotix*) Dep. Tr. 143:5-9 ("[A.] I think the long development time is an outcome of the various process points that you need to bring a medical device product to market that is safe for physicians to use with their patients. So I -- that's the process.").

[72] "Expert Report of Dr. Robert D. Howe, *In Re: Da Vinci Surgical Robot Antitrust Litigation*, Case No. 3:21-cv-03825-VC, January 18, 2023 ("Howe Report"). Specifically, *see* Howe Report, § V. *See also* Intuitive-00027844.

[73] DeSantis (in *Rebotix*) Dep. Tr. 145:9-25 ("Q. Another issue that might happen is that the EndoWrist might not have sufficient grasping force; right? A. Correct. Q. And that might happen before the lives on the use counter have run out; true? A. It -- it's possible, yes. So this is -- this is the reason we do live testing. We do live testing to be able to say things like that will not happen 95 percent of the time with 95 percent confidence. And depending on the failure mode, grasping versus cutting versus stapling versus -- we will set higher and higher specification confidence levels. And if we have a lot of things come back from the field like you're talking about that are not satisfying our requirements, we are required to do something about that."); DeSantis (in *Restore*) Dep. Tr. 22:10-23:14 ("A. …our testing is done to a test protocol… that are developed based on product requirements and -- and risk analyses…. [the test] took [the 22 total samples] through a series of… tests that we believe would have been representative tests of what they would experience out in the field, which includes simulated surgical use and cleaning and -- and reprocessing. And then it continues to test those units, and then documents their failure at, well, whatever number; and then so the statistical method backs into how many lives that we can safely indicate based on the confidence and reliability levels that -- that you were asking me about earlier. Ours are generally 90-percent confidence

confidence levels, which can vary by "failure mode" (such as "grasping versus cutting versus stapling") and tests that the instruments will meet those levels.[74] Another example is that Intuitive analyzes instruments that are returned because of a customer complaint against the instrument.[75]

32. When submitting documentation to the FDA for clearance, Intuitive includes its specifications and documentation (including data) that support those specifications.[76] Critically, for example,

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and -- for some failure modes and 95 percent for others, so 95 percent reliability/90 -- 95 percent confidence and 90 percent reliability and 90 percent confidence based on the failure modes."). *See also* Howe Report, ¶ 72 ("… Intuitive has standard procedures for modeling the reliability of the instrument by fitting the life test data to a Weibull reliability model. …Use of the Weibull model provides the ability to predict the reliability of the instrument as a function of number of uses, as well as uncertainty estimates (confidence intervals) for these estimates.").

[74] *Id. See also* Intuitive-00004692 at -702 ("Life testing protocols and reports trace to reliability requirements for instruments. The reliability and confidence levels of the life testing test cases vary depending on risk levels associated with different clinical risks and different failure modes."), and Intuitive-00552533, and Nixon (10/7/2022) Dep. Tr. 31:23-32:11 ("Q. And what's your general understanding of how those use limits were set? A. So for each of the instruments, there is an instrument architecture associated with it. There is a -- control parameters, how the instrument is driven, and a clinical use scenario that goes with each of the instruments, because they complete different surgical tasks. And so the combination of those three things were assessed to determine how we can ensure kind of consistent safety and efficacy of the instrument over the course of the lives of the instrument. And those came together to determine the lifes [sic] that came on the instrument.").

[75] DeSantis (in *Rebotix*) Dep. Tr. 203:2-7 ("Q. …When an instrument is RMAed, that means it's experienced a failure before its use count is at zero; right? A. Perhaps. More accurately, there's some type of complaint against the instrument."); Vavoso (in *Rebotix*) Dep. Tr. 201:23-202:2 ("A. No, what I said was that we will receive instruments back that have had some failure or some issue and the customer has processed an RMA. And then our -- our RMA team will look at that and understand why did the instrument fail.").

[76] DeSantis (in *Rebotix*) Dep. Tr. 132:14-133:8 ("Q. Well, when you're submitting documentation about an EndoWrist to the FDA, you include a proposed number of lives for that instrument; right? A. Yes. Q. And then some documentation that supports that number of lives for the instrument; right? A. Yes. We -- we provide them with the specifications for the instrument, including number of lives. And then we have to prove that we're sure it will work for those number of lives, and -- and they ask for that data. …the FDA doesn't impose specifications on -- on devices. The manufacturer will develop the specifications. And in our case, it's based on risk and requirements."); Rosa (in *Restore*) Dep. Tr. 42:11-43:2 ("Q. As

for EndoWrist instruments, Intuitive includes the number of uses per instrument and provides documentation to support its specification.[77]

33. In addition to the quality testing performed by Intuitive, every procedure a surgeon performs tests the integrity of the da Vinci Surgical System—including the instruments—based on the outcome of the surgeries.[78] Since 2009, more than 9.77 million procedures have been performed with the da Vinci Surgical System worldwide.[79] Through repeated use of the system, including the EndoWrist instruments, Intuitive continually achieves the quality objectives of the da Vinci Surgical System.[80]

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part of [the FDA clearance] process, does Intuitive provide its own testing data for the Endowrist Instruments to the FDA? …A. We provide extensive testing data to the FDA, yes. Q. As part of that clearance process, does Intuitive also disclose performance specifications for the Endowrist instruments to the FDA? A. I'm almost certain that our -- our requirements documents or the specifications as you're talking about them are part of that package.").

77 *Id. See also* Curet (in *Restore*) Dep. Tr. 26:17-23 ("Q. …Does Intuitive disclose any testing data regarding any testing to determine the maximum number of lives for EndoWrist instruments to hospitals? A. We tell hospitals how many lives they can use it for and what -- what -- how many lives is cleared by the FDA."). *See also* Johnson (in *Restore*) Dep. Tr. 21:23-22:10 ("Q. …Does Intuitive get clearance from the FDA for marketing and selling the EndoWrist? A. We do. Q. And that's true of the Si instruments? A. Yes. Q. And the Xi instruments? A. Yes. Q. And the instruments are all labeled with the number of lives for the instrument; is that right? A. Yes, we supply labeling that defines useful life and, often, how many times the device can be reprocessed.") and 40:16-41:8 ("Q. So Intuitive relied on simulated surgical use for its life testing? A. Yes. We're required by FDA to have our devices be tested in a simulated-use environment. They have to approximate the use environment. Q. Is that also called bench testing, or is that something different? A. It's likely something different. That's more engineering tests. Q. Do you know if there was any other life testing besides the simulated surgical uses? A. I do. We run multiple --…We run multiple tests, reprocessing tests, environmental tests, shipping tests, all sorts of different tests, to determine if the device is still safe and effective after it's – for its useful life.").

78 Intuitive 2021 Form 10-K at p. 27 ("Our success depends on the quality and reliability of our products… Because our products are designed to be used to perform complex surgical procedures, due to the serious and costly consequences of product failure, we and our customers have an increased sensitivity to such defects.").

79 *See* Public Data Workpaper.

80 *See also* DeSantis (in *Rebotix*) Dep. Tr. 271:6-14 ("A. Intuitive has 20 years and millions of procedures of instrument experience that -- you know, that we -- we know that what we do is safe, and we have a lot of information about ten lives, and quality levels, and the complaints,

d. Since its inception, Intuitive has employed an integrated business model

34. To "seamlessly translate[] the surgeon's natural hand movements… at a console into corresponding micro-movements of instruments positioned inside the patient," the da Vinci Surgical System has numerous components that must work precisely in concert.[81] In its 1995 draft business overview, Intuitive described its system as "a combination of servo technology, specialized instruments and 3D visualization to make minimally invasive surgery more intuitive for the surgeon to perform, and more flexible with respect to the range of maneuvers the surgeon can confidently carry out."[82] Since the launch of the first da Vinci Surgical System, Intuitive has been presenting and selling the da Vinci Surgical System as an integrated system including "a surgeon's console, a patient-side cart, a high performance vision system and [its] proprietary instruments."[83]

35. In addition to the fact that RAS can only be carried out as the sum of the parts (i.e., with the system as a whole), a key reason why Intuitive designed its product as an integrated system is to protect "the quality and the brand and the reputation of [its] entire platform."[84] Intuitive has a "multistep process" to terminate its relationship with customers that do not comply with its contractual agreements in order to "defend the reputation of the company and [its] platform."[85]

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et cetera. So, you know, if -- I believe when we're dealing with humans, and people and patients, that the onus is on, you know, the company providing to ensure that they're safe.").

81 Intuitive 2000 Form 10-K at p. 1.

82 Intuitive-00595673 at -679.

83 Intuitive 2000 Form 10-K at p. 1. *See also* Intuitive 2021 Form 10-K at p. 88.

84 DeSantis (in *Rebotix*) Dep. Tr. 265:9-11 ("A. …We feel that defending the quality and the brand and the reputation of our entire platform is paramount to patients/people but also to the company."). *See also* DeSantis (in *Rebotix*) Dep. Tr. 279:6-9 ("A. Intuitive doesn't want anybody to adulterate our platform in any way that can't be assured that it's a sufficient quality level that we have -- that -- that we provide our sales.").

85 DeSantis (in *Rebotix*) Dep. Tr. 268:22-269:3 ("A. We laid out a multistep process that would eventually get to the point where we didn't want to get to. But again, to defend the reputation of the company and our platform. Then again, if the hospital continued to use something that we felt was unauthorized, unsafe, we would terminate our relationship with the hospital.").

Intuitive's testimony indicates that the critical nature of ensuring the quality and safety of the system, particularly when patients are involved, is another reason behind its integrated model.[86]

2. Intuitive competes to persuade doctors (and their patients) and hospitals to choose its product over other surgical solutions

36. As discussed below, RAS is one of numerous treatment options for patients and healthcare providers, and the da Vinci Surgical System consistently competes with alternative surgical techniques and treatment options.

37. The medical community recognizes RAS as a treatment option alongside other surgical techniques. As of April 2021, there were hundreds of articles in databases of medical studies (PubMed, EMBASE, Scopus, and Cochrane Central Register of Controlled Trials) that compare RAS with laparoscopy, open surgery, or both types of surgeries based on the results of a randomized controlled trial.[87] The FDA website informs patients that "[r]obotically-assisted surgery is an important treatment option but may not be appropriate in all situations. Talk to your physician about the risks and benefits of robotically-assisted surgeries, as well as the risks and benefits of other treatment options."[88] Medical centers, such as the Mayo Clinic, describe RAS as an alternative to other surgical techniques.[89] RAS, and the da Vinci Surgical System, is

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[86] *See* fn. 80 above. *See also* DeSantis (in *Rebotix*) Dep. Tr. 253:1-4 ("A. …Because when it comes to robotic surgery, the trust and quality level to use the platform is paramount. And if you don't have that, it could destabilize the entire platform.").

[87] Naila H. Dhanani et al., "The Evidence Behind Robot-Assisted Abdominopelvic Surgery: A Systematic Review," *Annals of Internal Medicine* 174, No. 8 (2021): 1-2 ("Dhanani et al.").

[88] "Computer-Assisted Surgical Systems," U.S. Food and Drug Administration, accessed January 5, 2023, https://www.fda.gov/medical-devices/surgery-devices/computer-assisted-surgical-systems.

[89] "Robotic Surgery," Mayo Clinic, accessed January 12, 2023, https://www.mayoclinic.org/tests-procedures/robotic-surgery/about/pac-20394974 ("Surgeons who use the robotic system find that for many procedures it enhances precision, flexibility and control during the operation and allows them to better see the site, compared with traditional techniques.").

frequently compared with open surgery, laparoscopic surgery, and alternative options when deciding on the appropriate treatment for a patient.[90]

38. Evidence shows that healthcare providers consider costs when assessing their options across surgical solutions. For example, Intuitive's Customer Finance and Market Intelligence teams collaborated to develop a survey for approximately 600 customers within Intuitive's customer finance portfolio.[91] According to Intuitive, one of the key findings from the survey is that strategic, budgetary and return-on-investment opportunities all influence capital acquisition timelines for hospitals.[92] Testimony from hospital administrators about how they make capital allocation decisions confirms this. For example, Paul Plomin, vice president of finance for Franciscan Alliance,[93] acknowledges that their estimates of potential revenue from a capital expenditure take into account procedure volumes, service lines, and pay mix, among other things.[94] Similarly, they consider both the initial costs of capital as well as ongoing costs related to servicing or instruments and accessories.[95] Capital limitations are cited as the top reason for leasing as opposed to buying a surgical solution such as Intuitive's.[96]

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[90] In addition, a number of health insurers, including the Center for Medicare and Medicaid Services ("CMS"), pay the same reimbursement for da Vinci surgeries as for laparoscopic surgeries. *See* "Reimbursement Resources," Intuitive Surgical, Inc., accessed January 5, 2023, https://www.intuitive.com/en-us/about-us/company/reimbursement ("Surgical procedures performed using robotic assistance should be billed using existing CPT codes for laparoscopic surgical procedures when available."). *See also* "Da Vinci Surgical System 2022 U.S. Coding and Reimbursement Guide," Intuitive Surgical, Inc., accessed January 5, 2023, https://www.intuitive.com/en-us/-/media/Project/Intuitive-surgical/files/pdf/intuitive-da-vinci-reimbursement-and-coding-guide-1086609.pdf?la=en&hash=8165652F394F52049A8C6B333AFACDA8.

[91] *See* Intuitive-00045861 at -864.

[92] Intuitive-00045861 at -875.

[93] Plomin (11/8/2022) Dep. Tr. 14:13-15 ("Q. What is your role at Franciscan? A. Vice president of finance for Franciscan Alliance.").

[94] Plomin (11/8/2022) Dep. Tr. 60:10-62:20 and 65:10-66:5.

[95] Plomin (11/8/2022) Dep. Tr. 63:17-64:7. *See also* Plomin (11/8/2022) Dep. Tr. Exhibit 188B, which is a capital acquisition request form for three da Vinci Xi systems and details the financial considerations for the potential acquisition.

[96] Intuitive-00045861 at -872.

39. In addition to cost considerations, evidence indicates that hospital administrators also consider patient safety and outcomes when choosing a surgical solution. In an Intuitive presentation showing results from a hospital decision maker survey, hospital respondents consistently identified patient safety and satisfaction as an important component when demonstrating the need for large capital expenditures like surgical solutions.[97] For example, Paul Plomin of Franciscan Alliance emphasizes that safety is their first priority in making capital allocation decisions.[98] Patient need is one of the top drivers for upgrading to newer technology but when hospitals have competing capital expenditure priorities, return-on-investment determines investment in a surgical solution.[99]

40. Evidence also indicates that surgeons compared da Vinci and laparoscopy in the context of deciding whether to acquire a da Vinci Surgical System. For example, when Valley Medical Center was considering whether to purchase a second da Vinci Xi System, Dr. Landers wrote, "I was certainly hoping to move forward with Xi robot cases much sooner than I anticipated given the great advantages for surgeon and patients versus laparoscopic approach."[100]

41. Intuitive publicly compares the da Vinci Surgical System to alternative surgical solutions and treatments. In its public filings, Intuitive notes that it faces competition "with established minimally invasive surgery and open surgery" that are "widely accepted in the medical community and in many cases have a long history of use."[101] The presence of these alternative options is also reflected in Intuitive's marketing materials, where Intuitive has developed tools based on clinical and economic data comparing the value of RAS versus laparoscopic versus

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97 Intuitive-00118636 at -647.

98 Plomin (11/8/2022) Dep. Tr. 32:13-19 ("Q. How are individual Franciscan facilities expected to prioritize or rank their -- their requests on an annual basis? A. Well, number one should be if we have any safety issues. In fact, if it's a safety issue, we'll allocate the capital currently. We wouldn't wait for the next year.").

99 Intuitive-00045861 at -876.

100 VMC-00014375 at -379.

101 Intuitive 2000 Form 10-K at p. 31. *See also* Intuitive 2021 Form 10-K at p. 25.

open surgery for both patients and hospitals.[102] In these calculations, Intuitive appears to aim to demonstrate to healthcare providers as well as surgeons that the benefit of da Vinci surgeries—inclusive of savings related to improved patient outcomes—can translate to economic value.[103]

D. THE HISTORY OF THIRD-PARTY DA VINCI SYSTEM SERVICING AND ENDOWRIST RESETS

42. Below, I provide a brief history of third-parties' development of a "technology" that bypasses the usage limits on the EndoWrist instruments specified as by Intuitive, which has allowed these third-parties to create a marketplace for services that otherwise would not exist.

1. Rebotix Repairs LLC ("Rebotix")

43. The development of Rebotix's Interceptor "technology," the component that allows da Vinci S/Si EndoWrists to be reset,[104] traces back to Benjamin Biomedical, a "medical instrument repairs" company that specializes in "phaco hand pieces, harmonic scalpels and endoscopic video cameras."[105] Benjamin Biomedical has been performing instrument repairs since 1994.[106] In 2011, Glenn Papit (Vice President of Sales and Training at Benjamin Biomedical)[107] raised the idea with David Mixner (president and owner of Benjamin Biomedical) that there was

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[102] Intuitive-00412740 at -746 through -755.
Intuitive works with hospitals to measure specific clinical outcomes (including the rate of complications and the number of times a surgery must be "converted" to open surgery because of complications arising from the robotic surgery process) associated with the da Vinci surgeries performed by that hospital. *See*, e.g., Intuitive-00038260 at -266 through -277.

[103] *See*, e.g., Intuitive-00001788 at -815, -816 and Intuitive-00001237 at -272 ("[W]hen you look beyond supply costs and consider the potential improvement in outcomes, the impact of the total cost to treat patients can represent significant cost savings to hospitals.").

[104] *See* Papit (in *Rebotix*) Dep. Tr. 67:4-7 ("Q. Okay. The workaround to the EndoWrist usage counter is call the Interceptor; is that right? A. Correct.").

[105] "Company History," Benjamin Biomedical, accessed January 5, 2023, https://benjaminbiomedical.com/company-history.

[106] *Id.*

[107] REBOTIX000064.

"considerable interest from customers that… there is a rigid scope that is attached to a surgical robot made by Intuitive Surgical called the da Vinci robot."[108] Benjamin Biomedical began "R&D on servicing Wrists," i.e., EndoWrist "repairs," in 2012,[109] and the "R&D" was transferred from Benjamin Biomedical to Rebotix LLC, which was created in 2013.[110]

44. Throughout the development of the Interceptor[111] and launch of Rebotix, key personnel of Benjamin Biomedical (including David Mixner and Glenn Papit) continued to work on medical devices for other manufacturers through Benjamin Biomedical.[112]

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[108] Mixner (in *Rebotix*) Dep. Tr. 21:10-25 ("Q. When did that analysis or process of analysis begin? A. I'd approximately say 2011. Q. And within Benjamin Biomedical, who brought up the idea of looking at da Vinci products as a possible customer? A. What happened was, in approximately 2011, we were repairing another item called a rigid scope through Benjamin Biomedical, and it was brought -- Glenn brought to my attention that there was a considerable interest from customers that the -- there's a -- there is a rigid scope that is attached to a surgical robot made by Intuitive Surgical called the da Vinci robot. And so he -- we looked -- we started the process to figure out if this was something that we'd be interested in servicing.") and 23:5-9 ("Q. When the company of which you were president, Benjamin Biomedical, marketed its services in approximately 2011, 2012, did Benjamin Biomedical offer to prospective customers repair services? A. Yes, sir.").

[109] REBOTIX174692 at -692.

[110] *Id. See also* Papit (in *Rebotix*) Dep. Tr. 36:14-19 ("We felt it better to have a separate company because it was a separate kind of distinct repair to us, and it was going to take a lot of R&D investigation to decide how to set up the repair, and we didn't want that interfering with the flow of our Benjamin business."). Rebotix LLC is a separate corporate entity from Rebotix Repair LLC; *see* Papit (in *Rebotix*) Dep. Tr. 34:23-36:1.

[111] Papit (in *Rebotix*) Dep. Tr. 67:8-16 ("Q. Okay. Can you describe for me what the Interceptor is? A. In the EndoWrist, there's a DS2505 chip used by Intuitive. It's a commercial chip used in everything -- just a broad range of entities. It collects -- or it contains the serial number, the model number, and the number of uses on the EndoWrist. The Interceptor enables us to read those three points of data for resetting the count.").

[112] BB001260 ("Benjamin Biomedical, Inc. Employee List"). *See also* Papit (in *Rebotix*) Dep. Tr. 32:13-21 ("Q. Do Benjamin Biomedical and Rebotix Repair share any employees? A. Yes. Q. Who are those employees? A. Greg Fiegel does services for both, Chris Gibson does services for both, and I do services for both, and there are several technicians -- I shouldn't say several. There's one or two technicians who are cross-trained.").

In addition, Mr. Papit has his own marketing company called Pipicz, Inc. that can "provide services for whoever," and he worked for Rebotix through Pipicz. (Papit (in *Rebotix*) Dep. Tr. 220:3-13).

45. [redacted].[113] [redacted] Rebotix personnel have testified that the development of the Interceptor chip for the S/Si EndoWrist instruments "[redacted]"[116]

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[113] *See* fn. 111 above on the Interceptor chip. For Rebotix LLC personnel, *see* Papit (in *Rebotix*) Dep. Tr. 36:25-37:10. *See also* Papit (in *Rebotix*) Dep. Tr. 40:1-14 (on involvement of Stan Hamilton and Greg Fiegel in the [redacted]. *See* REBOTIX174692 at -692. *See* Posdal 30(b)(1) (11/1/2022) Dep. Tr. 83:11-17.

[114] Papit (in *Rebotix*) Dep. Tr. 167:14-21 [redacted] Hamilton (in *Rebotix*) Dep. Tr. 110:18-21 [redacted] *See also* DeSantis (in Rebotix) Dep. Tr. 244:5-11 ("A. …our specifications and our requirements are our intellectual property of the company which we've not released. So I don't know how a third party would be able to ensure and guarantee that their quality system -- that they were developing to our specs, that their quality system was sufficient and on part with us, et cetera, et cetera.").

[115] REBOTIX174692 at -692 and -693.

[116] Expert Report of Robert Mills, *Rebotix Repair LLC vs. Intuitive Surgical, Inc.,* Case No. 8:20-cv-02274, July 26, 2021 ("Mills Report"), ¶ 15 (citing to Mr. Mills' conversation with Glenn Papit, Greg Fiegel, and Chris Gibson on July 23, 2021 and to Papit (in *Rebotix*) Dep. Tr. 101:9-15).

46. Rebotix opened in January or February of 2019.[117] The company is owned by David Mixner, who also owns Benjamin Biomedical.[118] In addition to Mr. Mixner, employees of Rebotix include Glenn Papit, Chris Gibson, Stan Hamilton, Greg Fiegel, and a "couple technicians."[119]

47. Rebotix focuses on "repairing" EndoWrist instruments for the da Vinci S/Si platforms, including installations of its proprietary Interceptor chip to bypass the instruments' usage limits.[120] In sharp contrast with Intuitive's original specifications regarding the number of uses for EndoWrist instruments, Rebotix has represented to customers that the EndoWrist instruments could be "repaired" many times.[121] The company claims to provide no other "services to repair medical devices" besides EndoWrist "repairs" and to primarily serve U.S. customers.[122]

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[117] REBOTIX174692 at -695.

[118] Papit (in *Rebotix*) Dep. Tr. 32:7-12 ("Q. Is Benjamin Biomedical affiliated with Rebotix Repairs in any way? A. No, except that they're both owned by the same owner. A. And who is that? A. David Mixner.").

[119] Papit (in *Rebotix*) Dep. Tr. 142:12-19 ("Q. How many employees did Rebotix Repair have? A. I would say seven. That's probably where we were. Q. So that's David, Chris, you -- A. Stan. Q -- Stan -- A. -- me, Greg, any -- couple technicians.").

[120] Papit (in *Rebotix*) Dep. Tr. 104:23-25 ("Q. Has Rebotix ever offered any services to repair medical devices other than EndoWrists? A. No.").

[121] In an email to a potential customer at Premier, Inc. (REBOTIX081841), Chris Gibson attached "documentation on the repair service" that includes the following claim: "[Intuitive's] instruments are sold with an arbitrary use counter… Once the instrument has been reset there is no limit to the times it can be reset in the future… It is important to keep in mind that these types of instrument tool ends are no different than the other stainless steel laparoscopic instruments being repaired every day already" (REBOTIX081843 at -843). *See also* Gibson (in *Rebotix*) Dep. Tr. 65:6-14 ("Q. Did you ever tell any customers how many times they could expect to be able to reset the usage counter on an EndoWrist? A. I think we told them exactly what I said, that we can reset the counter an unlimited number of times, but not all EndoWrists will be available for the repair process because some of them will be so badly damaged or something else is wrong with them where they will not be a candidate for the repair service.").

[122] *See* fn. 120 and Papit (in *Rebotix*) Dep. Tr. 52:9-15 ("Q. So in 2018, Rebotix decided that it wanted to focus its efforts in the US and nowhere else; is that right? A. Correct. I wouldn't say nowhere else. The world was always the goal, but once you establish it in the US, the rest of the world follows.").

48. As part of its efforts to reach and engage with customers, Rebotix worked with distributors and sales representatives.[123] Distributors and sales representatives were compensated based on the difference between the retail price to the customer and the "distributor price" or "sales rep. price" set by Rebotix.[124]

2. Restore Robotics LLC ("Restore")

49. Between 2017 to 2018, Clif Parker, Kevin May, and Mills Vautrot ran Restore Medical Repair, which offered services on Stryker endoscopes, Olympus scopes, and Stryker cameras.[125] In a document used for potential customers, Restore Medical Repair claimed to have the capability of

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[123] Papit (in *Rebotix*) Dep. Tr. 102:19-21 ("Q. Did Rebotix use distributors to sell its service offerings on EndoWrist instruments? A. Yes."). *See also* Papit (in *Rebotix*) Dep. Tr. 152:17-20 ("Q. Were -- does Rebotix work with any sales representatives? A. Yes, we work with several independent sales representatives.") and 153:6-13 ("Q. Were the sales representatives' responsibility similar to distributors? A. That was just about identical. They would perform the same function basically. Q. Was there anything different about the sales representatives' function as compared to the distributors? A. Not really, no.").

Rebotix also had direct contact with some customers. *See* Papit (in *Rebotix*) Dep. Tr. 103:13-18 ("Q. Did Rebotix also contact customers directly? A. Yes. Q. And sell services to those customers directly without the use of a distributor? A. Yes.").

[124] REBOTIX062113 and REBOTIX062114 ("Sales Rep Pricing.docx"); REBOTIX040273 and REBOTIX040277 ("Rebotix Distributor Pricing.xlsx").

[125] Parker (in *Restore*) Dep. Tr. 24:19-22 ("Q. Over what time period was Restore Medical Repair doing business under that name? A. Probably would have been 2017 through 2018."); Vautrot (in *Restore*) Dep. Tr. 93:5-19 ("Q. Do you have any ownership interest in Restore Medical Repair? A. Yes. …..Q. Who else has an ownership interest in Restore Medical Repair? A. Clif and Kevin, and I don't know who else.") and 97:24-98:5 ("Q. Can you recall any of the manufacturers of devices that Restore Medical Repair offered services on? A. Stryker -- I'm drawing a blank on my endoscopes. But Stryker for the -- Stryker's endoscopes, and Stryker kind of does everything. Olympus scopes, Stryker cameras.").

repairing over 100 different devices.[126] The operations of Restore Medical Repair were eventually "rolled" into Restore.[127]

50. Around April 2018, Mr. May met Richard Mixner at the American Academy of Orthopedic Surgery trade show and discussed "what Rebotix [sic] capabilities were."[128] This event "sparked" Restore's interest in EndoWrist "repairs."[129] Restore formed a few months later in July 2018.[130]

51. Restore's original business plan involved "repairing" EndoWrist instruments and resetting the instruments' usage counters using "technology" developed by Rebotix Repair LLC

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[126] Vautrot (in *Restore*) Dep. Tr. 101:5-22 ("Q. How was this document used? A. Potential customers. Basically it was used to explain if someone said, 'Can you work on this particular instrument?' It was a way to look up and say, 'Yes, we can work on that particular instrument.' …Q. Best, estimate, just looking at this document, how many different devices are listed for which Restore Medical Repair can provide repair capabilities? A. I -- I don't know. Over 100.") and Restore-00001939 (Vautrot Exhibit 1).

[127] Parker (in *Restore*) Dep. Tr. 24:13-16 ("Q. And is -- is Restore Medical Repair still in business today? A. Oh, we rolled the operations into Restore Robotics, so it's not operating as a separate entity.").

[128] Parker (in *Restore*) Dep. Tr. 27:3-18 ("Q. Was there a -- a particular event that sparked your interest in a plan that had you repairing EndoWrist instruments and -- and other activities, associated activities? A. Yes. When Kevin May was at a medical device conference, he met a gentleman from Rebotix. They had a conversation about what Rebotix capabilities were. Oh, and Kevin immediately called me and said I think this is a great opportunity, a great addition to what we're doing; and let's take a look at it. Q. As near as you can recall, when was that conference that Kevin May attended and met someone from Rebotix? A. Mid-April of 2018."); May (in *Restore*) (5/6/2021) Dep. Tr. 30:24-31:15 ("Q. When did you first have any contact with Rebotix? A. First contact with Rebotix was in 2018. April/May timeframe. Q. And who was the first person affiliated with Rebotix that you had any personal contact with? A. Robert Mixner. Q. Who introduced you to Mr. Robert Mixner? A. Nobody. I had -- I met him at the AAOS trade show, the academy -- American Academy of Orthopedic Surgery, and he was -- he had a booth there. Q. And did you two get talking about the business that they were in and the business that you were in? A. Yes.").

[129] *Id.*

[130] Parker (in *Restore*) Dep. Tr. 9:18-20 ("Q. How long has Restore Robotics been doing business under the name Restore Robotics? A. Since July of 2018.").

("Rebotix").[131] Initially, Restore worked with Rebotix for commission by sending instruments from potential customers to Rebotix to perform "repairs."[132] In October 2018, this initial agreement changed into Restore becoming the exclusive authorized "repair" center for Rebotix, and Restore performing "repairs" and "service" using the interceptor system from Rebotix.[133] Under this agreement, Restore would pay Rebotix for the interceptor "technology," equipment, and licensing fees in exchange for exclusive rights for all "repairs" in the U.S. and nonexclusive

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[131] Parker (in *Restore*) Dep. Tr. 26:7-13 ("Q. When you began business as Restore Robotics, what was the business plan, if any, that you had for -- for that company? A. The primary business plan was to repair the EndoWrist instruments; reset the counter; and, you know, provide hospitals with a reduced cost for the instruments that they owned."). *See also* Parker (in *Restore*) Dep. Tr. 29:24-30:7 ("Q. Going back to approximately mid-April of 2018, what did Mr. May describe to you about his meeting with someone from Rebotix at a -- I think you said a trade show? A. He described they had a technology that would allow the counter in the EndoWrist to be reset, or they could be used for an additional ten uses, and he thought it was a great opportunity and wanted us to examine it further.").

[132] Parker (in *Restore*) Dep. Tr. 48:9-19 ("Q. Would the instruments be coming from Rebotix to Restore or from Restore to Rebotix or both? A. They would come from a potential Restore customer to Rebotix, and then Rebotix would then do the repair and send it back to the customer, so Rebotix would -- basically dealing with the customer. Q. And under this unwritten deal, how -- how would Restore be paid or by whom would Restore be paid? A. Rebotix would pay Restore a commission.").

[133] Parker (in *Restore*) Dep. Tr. 49:19-50:12 ("Q When you reached the point with Rebotix that you thought you had agreed on a long-term arrangement between your company and Rebotix was that deal written down and signed? A. Yes. Q. And what were the essential terms from your standpoint? A. …it changed quickly to us becoming the exclusive authorized repair center for them, and then they started selling us their interceptor system, and then we would then mark up that service and sell to our customers. And we would perform the work."). *See also* Parker (in *Restore*) Dep. Tr. 50:17-22.

rights to sell outside the U.S.[134] [redacted] employees performed the installations of the Rebotix interceptor "technology" for Restore.[135]

52. In addition to marketing its da Vinci-related business through its "website, flyers," and sales representatives, Restore worked with a number of distributors for its EndoWrist business including [redacted].[136] The relationship and agreement between Restore and Rebotix ended in July 2019.[137] As of October 2019, Restore still intended to continue "repairing da Vinci robots."[138]

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[134] Parker (in *Restore*) Dep. Tr. 55:12-56:2 ("Q. Okay. And do you remember the material terms of the second signed agreement? A. Yes. Q. What were they? A. They would charge us [redacted] for their interceptor, and we would purchase a quantity at a time. I think it was either [redacted] or a [redacted] at a time. Plus, we paid an initial up front, I want to say, [redacted] for equipment and licensing fees. Q. Under the second signed agreement were there any exclusivity provisions? A. Yes. Q. What were they? A. We had the exclusive rights for all repairs in the United States, and we had nonexclusive rights to sell outside the United States.").

[135] Parker (in *Restore*) Dep. Tr. 64:1-10 ("Q. Did any employees of Restore Robotics Repairs ever accomplish the physical work of installing the Rebotix interceptor technology in instruments of the da Vinci robotics system? A. I don't believe so. No. Q. To the best of your knowledge, were the only installations of – of the interceptor technology accomplished by employees of Medivision? A. That's the best of my recollection. Absolutely.").

[136] Vautrot (in *Restore*) Dep. Tr. 62:1-22 ("Q. And the marketing that was done was a website, flyers, and working with sales reps; is that correct? A. Yes. …Q. What about distributors? Has Restore done any work with distributors regarding its EndoWrist or da Vinci-related business? A. Yes. Q. Which ones? A. Let's see, was [redacted]").

[137] Mixner (in *Rebotix*) Dep. Tr. 121:7-21 ("Q. Okay. And was the agreement that you know about the one that you terminated here in this document dated July 8th of 2019? A. I would think so, yes, although I did not write this document. Q. Okay. Did you read it before you signed it? A. Yes. Q. Did you intend to terminate the distributorship agreement? A. Yes. Q. Why? A. We felt as if Clif was overpromising his abilities to repair the EndoWrists, and thus we were -- we were not selling the chips or the component to Clif that he told us that he would be purchasing from us.").

[138] Parker (in *Restore*) Dep. Tr. 184:17-22 ("Q. In October of 2019, did -- did you still intend to develop a business repairing da Vinci robots? A. Once we got the -- the lawsuit settled, whichever way that went, then, you know, we intended to continue the business.").

53. [redacted]

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[139] Parker (in *Restore*) Dep. Tr. 204:16-22 ("Q. Do you know of any other company that's -- offers technology that would bypass or defeat the usage counter in the Intuitive instruments? A. Yes. Q. Who else makes that technology? A. It was developed through a -- Alliance HealthCare."). Mr. May named "Innovative Health" as the company that Restore hired to develop the "technology;" *see* May (in *Restore*) (6/8/2021) Dep. Tr. 235:3-9 and 235:14-18.

[140] Parker (in *Restore*) Dep. Tr. 205:22-206:2 ("Q. Do you have any recollection without guessing which you can provide as to the cost of -- that you paid, that your firm's paid for this -- to develop this technology? A. Give me a second. I'm guessing [redacted].").

[141] May (in *Restore*) (6/8/2021) Dep. Tr. 250:11-23 ("Q. Now, when you agreed with [redacted] to authorize them to try to develop a defeat device for EndoWrist instruments, what were you going to do with that defeat device if and when it was developed? A. Well, if and when it was developed, we were going to service instruments and/or get a 510(k) to be able to take legal ownership of devices. There was going to be two paths there. Q. And you were going to compete with Rebotix, weren't you? A. Yes, there was going to be some competition with Rebotix.").

[142] Parker (in *Restore*) Dep. Tr. 206:12-13 ("Q. [redacted]").

"[redacted]

54. In addition to facilitating the reset of EndoWrists, Restore hired former Intuitive technicians (namely, Mr. Gordon and Mr. McDaniel) and offered da Vinci System "servicing" after January 2019.[145] Restore advertised that its preventative maintenance program would "provide[] the confidence and certainty of knowing that the surgical robot remains within 'spec.'"[146] Restore's owners testified that the basis for the statement is the prior "training" of these technicians.[147]

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[143] Parker (in *Restore*) Dep. Tr. 211:22-212:13 ("Q. …Do you, Mr. Parker, have plans to sell or lease or otherwise market and distribute your technology to defeat the Intuitive instrument's usage limiter?" A. Yes. Q. …do you have any plan to seek regulatory approval from the FDA -- regulatory clearance, excuse me, from the FDA in the event you decide to launch this technology on the industry? A. Yes. Q. What are your plans? A. We have already, through another company, filed for a 510(k).") and 213:9-25 ("Q. Have you submitted a single 510(k), or are there multiple 510(k)s that you've submitted as part of the process you described? A. A single. Q. And when did you do that? A. February 12th or 15 -- February the 15th of 2021. Q. …In the name of what entity is the 510(k) submitted? A. Iconocare.").

[144] 510(k) Premarket Notification Summary Letter Regarding K210478 for 8mm Monopolar Curved Scissors, U.S. Food and Drug Administration, Accessed January 12, 2023, https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf.

[145] Parker (in *Restore*) Dep. Tr. 91:18-20 ("Q. And when did Mr. Gordon come to work for Restore? A. It was either January or February of 2019.") and 92:7-9 ("Q. Okay. And when did Mr. McDaniel come to work? A. I believe it was January of 2019."). *See also* Restore-00055937.

[146] Parker (in *Restore*) Dep. Ex. 3 at -525. However, Restore was not able to guarantee that they could return the surgical robot to its original specifications. *See* Gordon (in *Restore*) Dep. Tr. 141:11-21 ("Q. When you were working for Restore, were you able to access system software or utilize system software in repairing da Vinci robots? A. No. Nothing other than the actual, you know, in the software when you turn it on and it gives you error logs. I mean, everyone would see that. But accessing anything internally? No, not at all. I never tried. Q. Okay. A. I've never connected anything into a system at all."). *See also* Gordon (in *Restore*) Dep. Tr. 143:25-144:4 ("Q. When you performed P.M.s on da Vinci robots for Restore, were you able to guarantee to customers that the robots remained within O.E.M. specifications. A. Absolutely not. No.")

[147] Parker (in *Restore*) Dep. Tr. 90:6-13 ("Q. … And in what way did the PM-ONLY program provide certainty of knowing that the surgical robot remains within spec? A. Because the robot would be serviced, and the preventative maintenance would be performed by a former Intuitive Surgical field service engineer, so they understand what's required to perform a -- a

From June 2018 through December 2020, Restore had one customer for da Vinci System "preventative maintenance service"—[redacted].[148]

55. Since the company formed in 2018, Restore has expanded into other business lines. For example, Restore offered "repair" services for other medical devices.[149]

3. Surgical Instrument Service Company ("SIS")

56. SIS is a surgical instrument and device repair company that was founded in 1971.[150] SIS provides repairs for a variety of instruments including stainless steel instruments and specialty

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PM, and they would do so."). *See also* Parker (in *Restore*) Dep. Tr. 91:2-10 ("Q. …At the time of this presentation, did Restore Robotics or any other of your companies have possession of the specifications for the da Vinci surgical robot? A. We had the Intuitive Surgical engineers who are trained to make sure the robot stayed within specifications; and they understood what those specifications were, 'cause they were trained by Intuitive Surgical.").

[148] May (in *Restore*) (5/6/2021) Dep. Tr. 180:21 ("A. …We only had one customer for robotics service."). *See also* Restore-00055935 and Restore-00055937.

[149] Parker (in *Restore*) Dep. Tr. 26:14-21 [redacted]

[150] "About Us," Surgical Instrument Service Company, accessed January 3, 2023, https://sis-usa.com/about/.

surgical instruments such as flexible endoscopes, video systems, and orthopedic drill saws.[151] Greg Posdal is the President and CEO of SIS.[152]

57. SIS learned of EndoWrist resetting through Rebotix.[153] In the summer of 2019, Mr. Posdal spoke with Chris Gibson, COO at Rebotix,[154] about Rebotix's business proposition to gather

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[151] Posdal (in *Restore*) Dep. Tr. 6:20-7:1 ("Q. What sorts of devices does S.I.S. repair? A. A wide breadth of services from general stainless steel type instruments, scissors, hemostats and the like, to specialty surgical instruments to rigid endoscopes, flexible endoscopes, video systems, orthopedic drill saws, reamers, and some other miscellaneous items."). *See also* Posdal (in *Restore*) Dep. Tr. 70:18-25 ("Q. What are some of the other instruments that S.I.S. repairs? A. General surgery instruments; specialty surgery instruments, mostly stainless steels; bipolar instruments; monopolar instruments, that's electrosurgery; instruments -- flexible endoscopes; rigid endoscopes; power equipment; video equipment; and some other miscellaneous items."); "Services," Surgical Instrument Service Company, accessed January 3, 2023, https://sis-usa.com/services/.

[152] Posdal (in *Restore*) Dep. Tr. 27:5-6 ("Q. What is your current position? A. President, C.E.O.").

[153] Posdal (in *Restore*) Dep. Tr. 31:11-32:11 ("Q. When did you first have contact with Rebotix Repair? A. Summer of 2019, June-ish. Q. And was there anyone who was involved in connecting you with Rebotix Repair? A. I was working with Chris Gibson, who was supplying us with camera parts. And they were starting this other business, Rebotix, and that's how I found out about them. Q. Do you have any understanding that Rebotix Repair had done any work on EndoWrist instruments prior to it being formed as Rebotix Repair? A. No. Q. What was your basis of your understanding that Rebotix was starting a business? A. A conversation with Chris Gibson. Q. And did Mr. Gibson inform you that Rebotix Repair was starting a new business? A. That they already had, yes. Q. And what was that business? A. Basically, gathering EndoWrists that were near their expiration, number of uses, and being able to reprogram the chip so that the com – the robot would read additional use availability, and making any other adjustments that needed to be to bring it back within spec if it was out of spec.").

[154] Gibson (in *Rebotix*) Dep. Tr. 73:8-12 ("Q. Are you currently employed by Rebotix Repair LLC? A. Yes. Q. What's your title? A. COO.").

EndoWrists near expiration and reprogram them for additional uses.[155] SIS previously worked with Benjamin Biomedical.[156]

E. NAMED PLAINTIFF HOSPITALS

1. Larkin Community Hospital

58. Plaintiff Larkin Community Hospital ("Larkin") is a Florida corporation with its principal place of business located in Miami, Florida. Larkin was incorporated on February 21, 1997 to operate a 146-bed general acute care hospital in South Miami, Florida.[157]Larkin currently has two campuses: South Miami and Palm Springs.[158] The Palm Springs campus was purchased around

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[155] Posdal (in *Restore*) Dep. Tr. 32:2-11 ("Q. And did Mr. Gibson inform you that Rebotix Repair was starting a new business? A. That they already had, yes. Q. And what was that business? A. Basically, gathering EndoWrists that were near their expiration, number of uses, and being able to reprogram the chip so that the com -- the robot would read additional use availability, and making any other adjustments that needed to be to bring it back within spec if it was out of spec."). *See also* Posdal (in *Restore*) Dep. Tr. 50:2-12 ("Q. And how did the issue come up in that relationship with Rebotix about, quote, repairing, end quote, EndoWrist instruments? A. I ran into them at an industry trade show in Cleveland. I can't remember the exact show. It may have been IACSMM, which is Central Sterile Materiel Management -- materiel managers [sic]. It was Cleveland late spring, early summer 2019. And he was there, I didn't know he was going to be there, but he was there with -- promoting this process.").

[156] Posdal 30(b)(1) (11/1/2022) Dep. Tr. 23:23-24:3 ("[A.] …As -- as stated earlier, we had a long lasting relationship with Benjamin Biomedical, which has the same -- same individuals involved with it as re- -- as Rebotix. And I had seen them at one of the trade shows we were at, and they were displaying that new technology."). *See also* Posdal (in *Restore*) Dep. Tr. 49:21-50:1 ("Q. Okay. Let me try to shortcut some of the questions I had before the break. Mr. Posdal, how were you first introduced to Rebotix Repair? A. We were working on another project together. They sell our company components for video equipment repair.").

[157] LARKIN-00011618 at -625.

[158] Sosa-Guerrero (9/23/2022) Dep. Tr. 11:15-24 ("Q. And I understand that -- when you were the CEO of Larkin, did it have two different hospital campuses? A. At one point, it did. Q. Okay. What point are you thinking of? A. I believe it was -- we purchased -- I don't remember, but I think it was 2016 that we acquired Palm Springs. Q. Okay. Prior to purchasing Palm Springs in around 2016, did Larkin have only one hospital campus? A. Yes.").

2016.[159] Larkin provides general health care services, including inpatient, outpatient, and emergency room, to residents within Miami-Dade County.[160] Larkin Health System was incorporated on January 27, 2016 to be the holding company for Larkin Community Hospital among other operating companies.[161] Larkin Health System is an integrated healthcare delivery system accredited by the Joint Commission with locations in South Miami, Hialeah and Hollywood, Florida.[162] Larkin leased two da Vinci Surgical Systems, an Xi and an Si, from Intuitive in June 2017, pursuant to written lease agreements.[163]

59. The decision to lease two da Vinci surgical robots came from senior leadership including the CEO and CFO of Larkin.[164] Physicians at Larkin had some say in the purchase of medical equipment including the da Vinci robot.[165] Dr. Estape, physician at Larkin, noted that Larkin leased the two da Vinci robots for him to perform surgeries at Larkin Hospital.[166] In 2017, Dr.

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[159] *Id.*

[160] LARKIN-00011618 at -625.

[161] *Id.*

[162] "Larkin Health", Larkin Community Hospital, accessed January 5, 2023 https://larkinhealth.com/en/.

[163] Amended Complaint, ¶ 11.

[164] Early (10/6/2022) Dep. Tr. 189:7-12 ("Q. Who -- who at -- who at Larkin, to your knowledge, made the decision to actually purchase the two Da Vinci Surgical Systems? A. Well, that would have come from our -- our senior leadership, that I would be involved with our CEO and our other leaders.").

[165] Early (10/6/2022) Dep. Tr. 193:25-194:10 ("Q. Thinking back before the, Larkin purchased the Da Vinci Surgical Systems, did you tell Ms. Sosa-Guerrero that Larkin should not purchase those -- the robots? A. No, not that I can recall. Again, I, if the physicians were -- if the physicians were not going to use it, of course that would have been no. But the physicians were going to come. And I don't think anybody would have planned on acquiring that equipment if the expectation wasn't that physicians would use -- utilize that equipment."). *See also,* Estape (10/22/2022) Dep. Tr. 27:7-17 ("Q. Do you have an understanding as to why Larkin purchased two systems? A. Well, it's very inefficient to work in one -- the volume that I had at the time, I do about eight to ten cases a day. To do all that on one robot is very inefficient. So to bring my program over -- and I had talked to several other hospitals in the area -- I would need to have two robots. So those were my needs. To be able to run the program at the volume I had, I needed two robots. One was not enough.").

[166] Estape (10/22/2022) Dep. Tr. 22:12-21 ("Q.… At some point, am I right, you had a relationship with Larkin Community Hospital? A. Yes. When I left Baptist Health, Larkin

Estape performed 151 non-robotic cases and 202 robotic cases.[167] On average in 2017, Larkin performed 32 robotic cases per month.[168]

60. In an email exchange dated October 31, 2016 before the leasing of two da Vinci Surgical Systems, Mark Early, CFO of Larkin noted that Larkin had a serious cash flow issue.[169] Dr. Estape noted that Larkin's financial issues did not impact its robotics program.[170] Jose Gonzalez, former OR scheduler at Larkin, claimed that Larkin was behind on its payments to Intuitive due to its financial issues, but did not know specifics about the financial issues.[171] Sandy Sosa-

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Hospital was almost literally across the street from one of the Baptist Health hospital at South Miami, and that's right were my office was at. And so I spoke with the director there and they were very willing to have me come over and buy two robots for me and for me to be able to do the cases there at Larkin Hospital.").

[167] Sosa-Guerrero (9/23/2022) Dep. Tr. 159:20-25 ("Q. So you believe that the 151 cases for nonrobotic were cases that were performed by Dr. Estape? A. Yes. Q. And the 202 were robotic cases performed by Dr. Estape; right? A. Yes.").

[168] Sosa-Guerrero (9/23/2022) Dep. Ex. 36 at -758 (Analysis of 2017 Outpatient Robotic Surgeries). ("There are on average 32 Robotic cases per month, and the lease payment for both leases is $22,657, so and average of $712/per case.").

[169] Early (10/6/2022) Dep. Ex. 79 at -214. *See also,* Early (10/6/2022) Dep. Tr. 223:19-224:13 ("Q. And you write: Great job. We have a serious cash flow issue and need to identify cash reduction immediately. All nonessential purchases must be deferred. Do you see that? A. Yeah. Q. Do you recall what the cash flow issue was at this time in October of 2016? A. That could be, like, one payroll coming up and we want to make sure that we're -- we have enough cash available for a payroll. So it could be a one-time event. So a specific, -- this specific -- no, I don't remember the specific issue with that. Q. Is it fair to say that in the time period from 2016 to 2021 that Larkin often had a serious cash flow issue? A. I don't know about often, but at times we had cash flow issues, more so after the issue we had with our funding related to the previous email we discussed.").

[170] Estape (10/22/2022) Dep. Tr. 31:12-24 ("Q. Were you aware about the financial issues that Larkin was having while you were affiliated with them? A. Yes, sir. Q. Did that impact your robotics program at Larkin in any way? A. You know, incredibly enough, it didn't. Because the people like Jose, people like Barbie that had been running my program for years were able to somehow get the equipment that we needed to do the procedures, but I knew that there was some significant issues with payments to a lot of companies. So yes, I did know about that.").

[171] Gonzalez 30(b)(1) (10/17/2022) Dep. Ex. 91. See also, Gonzalez 30(b)(6) (10/17/2022) 60:4-14 ("Q. Okay. Do you recall that -- that Larkin was way behind in its payments that it owed to Intuitive when you were the director of surgery? A. I was made aware of it, yes. Q. Okay.

Guerrero, former CEO of Larkin, admitted that Larkin was struggling financially even without the da Vinci robot and was unable to pay "over 30" of its vendors.[172] Larkin received discounts totaling $473,500 on the leasing of the Si and Xi robots.[173]

2. Franciscan Alliance, Inc.

61. Plaintiff Franciscan Alliance, Inc. operates a not-for-profit healthcare system, known as Franciscan Health, Inc. (collectively, "Franciscan").[174] Franciscan is one of the largest Catholic healthcare systems in the Midwest; it is composed of 13 hospital campuses in Indiana, Illinois, and Michigan.[175] Franciscan provides emergency, medical, surgical, behavioral, rehabilitative, and other health services in inpatient and outpatient settings.[176] Between 2015 and 2021, Franciscan has purchased at least 12 da Vinci Surgical Systems across eight of its campuses, all of which remain in use.[177] Franciscan Lafayette first purchased a da Vinci Surgical System in

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Do you know why it was that Intuitive -- that Larkin was so far behind in its payments to Intuitive? A. I believe Larkin was having financial issues. Q. Do you know what the financial issues were from? Why was Larkin having financial issues? A. No.").

172 Sosa-Guerrero (9/23/2022) Dep. Tr. 147:13-22 ("Q. So at this time, this is in November 2017 -- November 17th, 2017. Is it consistent with your recollection that Larkin was behind in its payments to a number of vendors at this time? A. I was aware that we were behind. What I'm not aware about was, was it over a million. I don't recall how much it was. Q. Do you remember the names of any of the vendors that you were behind on? A. Over 30.").

173 Sosa-Guerrero (9/23/2022) Dep. Tr. 100:13-15 ("Q. And the total discounts that -- that Intuitive was offering was $473,500; correct? A. Yes").

174 Amended Complaint, ¶14.

175 *Id*.

176 Franciscan Alliance, Inc. and Affiliates Consolidated Financial Statements with Supplemental Financial Information December 31, 2021 and 2020, p. 7, Franciscan Alliance, Inc., accessed January 5, 2023, https://www.in.gov/health/files/Franciscan-Alliance-CFS-YE12312021-and-2020.pdf.

177 *See* Plaintiff Franciscan Alliance, Inc.'s Amended Objections and Responses to Defendant's Second Set of Interrogatories, September 30, 2022, pp. 13-14.

2009 when multiple gynecology surgeons requested one.[178] Surgeons at the Indianapolis campus performed 455 da Vinci procedures in 2017.[179]

62. Procurement requests for items over $500,000 (such as a da Vinci Surgical System) begin with documentation of the rationale for the device.[180] This stage is usually the product of requests from physicians, both formal and informal.[181] The finance department would then performs a return on investment and portfolio pro forma analysis, and the results are presented to corporate leadership for the funding.[182] Corporate leadership, through the "Capital Allocation Committee," makes the final decision.[183] Franciscan's relationship with Intuitive and its purchases of Intuitive

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[178] Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 25:23-26:16 ("Q. When did the Lafayette location of Franciscan start using da Vinci surgical systems for surgeries? A. 2009. Q. And why did Franciscan Lafayette first start using the da Vinci machines? …[A.] We had GYN physicians make the request. …Q. And why did they say they wanted the da Vinci surgical robots available for their use? …[A.] I don't remember. ….Q. Do you remember the names of the GYN surgeons who made that request? A. I do. Dr. McKweg, Dr. Wickert, Dr. Harrison were top three.").

[179] Amended Complaint, ¶¶ 14-16.

[180] Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 21:3-14 ("Q. All right. So for equipment, who had the authority to make the decision on final purchase? A. Again, it would depend on the dollar amount. If it was not a threshold request, that could be done at the local facility based on their allocation of dollars. If it was a threshold request, that needed to come to our corporate leadership group for that further decision. Q. And what does the term 'threshold request' mean at Franciscan? A. Greater than $500,000.").

Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 103:21-104:12 ("So could you please walk me through before Franciscan had the master agreement, what would the procurement process be for a hospital that wanted to purchase a da Vinci robot? A. So speaking from my director days, we would identify a need for procuring either a robot or a second robot. We would have to have a request for that, and have documentation for reasoning, for needing a robot or a second robot; that, in turn, requests would be taken forward and our finance department would assist in developing a return on investment and a portfolio pro forma so that we could make the presentation to our corporate senior leaders for the funding. And then if that funding based on that request was approved, then the facility was approved for purchase."). Other testimony describes this process as being current. *See also* Plomin (11/8/2022) Dep. Tr. 16:25–18:18; 27:25–30:16; 31:6–32:12; 33:10–34:23; 35:24–39:3.

[181] *Id.*

[182] *Id.*

[183] *Id.*

products are currently governed by its master agreement, which was undertaken to simplify the purchasing process; Franciscan also obtained better prices through the negotiation.[184]

63. Franciscan also has a Robotics Steering Committee, comprised of physicians, which meets quarterly for the purpose of reviewing Franciscan's robotic surgery program and its metrics.[185]

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[184] Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 80:24-81:19 ("Q. Why did Franciscan decide to negotiate that master agreement? A. We needed terms and conditions to govern our purchases for capital equipment, as well as products and establish a standard transaction agreement. Q. And why did you need that? A. So we didn't have to do a review every single time we made a purchase. Q. The master agreement simplified the purchasing process; is that fair? A. From a capital standpoint, yes. Q. Did Franciscan obtain better prices through this master's agreement, as well? A. Pricing was negotiated, yes."). Other testimony supports the idea that Franciscan received discounts through negotiation. *See also* Sampson (11/3/2022) Dep. Tr. 37:9-38:25 ("Q…'By purchasing these 5 systems together we'll save $1.07 million.' Do you see that? A. Correct. Q. And is that accurate? A. To my knowledge, that's accurate…Q. Okay. So it's correct that Franciscan ultimately saved 1.07 million on this purchase? A. Yes, as far as we were concerned… Q. Okay. Fair to say from these E-mails that your colleagues were happy with the outcome of the negotiation? A. Yes. Q. Is it fair to say you were primarily responsible for obtaining that good outcome? A. It was a team effort, but yes. Q. And how did you obtain that discount? A. We obtained that discount by -- like I said, a couple ways. One, we purchased all of those systems at the same time instead of having each individual hospital purchase them individually. So that was a factor. There was also the factor that we were pressured to get the deal done before the end of September so that Intuitive would have the POs and be able to deliver the systems before the end of September because that was the end of their annual fiscal year.").

[185] Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 30:3-19 ("Q. … During the time you worked as Franciscan Health Lafayette, what were the robotics steering committee's responsibilities and authorities? … [A.] It was to bring physicians together who were performing robotics to appropriately operationalize our robotics program and to govern statistics and operational metrics. …Q. Can you explain what you mean, please, by 'govern statistics and operational metrics'? A. To review our block time potentially, depending on what the agenda items were and those particular physicians' request. It may involve reviewing operating time, procedure, volume.") *See also* Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 29:12-14 ("Q. When you were at Lafayette, how often did the robotics steering committee meet? A. Quarterly.").

3. King County Public Hospital District No. 1, DBA Valley Medical Center

64. Plaintiff King County Public Hospital District No. 1, DBA Valley Medical Center ("Valley Medical"), is a Washington municipal corporation and non-profit healthcare provider located in Renton, Washington.[186] Valley Medical is the largest non-profit healthcare provider between Seattle and Tacoma, serving over 600,000 residents as a 341-bed acute care hospital and clinic network.[187] Valley Medical is managed as a component of University of Washington Medicine, subject to the oversight of a Board of Trustees, and includes a hospital and a network of more than 40 primary and specialty care clinics throughout Southeast King County, Washington.[188]

65. Valley Medical has used da Vinci Surgical Systems, including the Si and Xi, since 2006 at the latest.[189] Valley Medical currently owns two Xi models.[190] Over the last several years, Valley Medical has averaged nearly 350 surgeries annually using da Vinci Surgical Systems (430 surgeries in 2019).[191] The chairman of the surgery department and many other surgeons advocated for the upgrade to an Xi model because the advances in technology had improved greatly, and their Si was one of the oldest in the state.[192]

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[186] Amended Complaint, ¶ 18.

[187] We Are Valley: UW Medicine Valley Medical Center Fact Sheet, Valley Medical Center, accessed January 5, 2023, https://www.valleymed.org/globalassets/valley-medical/media/vmc_corp-factsheet.pdf at p. 1.

[188] Amended Complaint, ¶ 18.

[189] Amended Complaint, ¶ 19.

[190] Amended Complaint, ¶ 19.

[191] Amended Complaint, ¶¶ 18-19.

[192] Burke (9/27/2022) Dep. Tr. 59:5-13 ("Q. You said earlier that you were advocating for the purchase of an Xi; correct? A. Yes. Q. Why did you want the hospital to purchase an Xi? A. At that time, I thought that the advances in the technology had improved enough to warrant another robot, plus we had -- our Si was probably the oldest one in the State of Washington.") and Wagner (10/11/2022) Dep. Tr. 44:15-25 ("Q. And what was the nature of that discussion? A. The nature of that discussion primarily was with surgeons, they were under the -- under -- we had an understanding that the Si robot was nearing end of life, reported to us that it was one of the oldest in the state, in fact, I seem to recall that they had shared with us -- they, meaning da Vinci, that it was one of the oldest on the West Coast, and

66. The decision to purchase the da Vinci Surgical System was left mostly to the CEO and CFO of the Valley Medical system.[193] Recommendations by hospital staff are often made regarding purchases, but executive staff is generally in control of the decision making process.[194] A list of needs would be compiled and organized in order of priority, and the CFO would provide final approval of spending.[195] Valley Medical has a formal committee on robotic surgery, whose role included assessing the credentialing process for surgeons to use the da Vinci.[196]

67. Valley Medical's end of year net position (which includes all of its assets and liabilities, using the accrual basis of accounting as well as deferred inflows and outflows of resources) increased during the period from 2018-2021, but its net operating income declined each year from $11.8

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there was need and a desire from surgeons to want to use the Xi robot, and so we had ongoing discussions…").

[193] Burke (9/27/2022) Dep. Tr. 32:17-34:8 ("Q. Did the robotics committee have a role in decisions to purchase Da Vinci robots? A. No. Q. Did you have a role in decisions to purchase Da Vinci robots? A. No. I made recommendations; I mean, I wanted a robot. I mean, that's why we moved right on and got a second one. But we didn't -- we didn't make those decisions. Those were all made in what's referred to as the C-suite or the finance division… we all made recommendations to keep the program going, but we didn't have any financial power to make that decision.").

[194] *Id.*

[195] Wagner (10/11/2022) Dep. Tr. 41:24-43:1 ("…we'll make a list of strategic needs, things that are needed to support the mission of the hospital, new program services, et cetera, and were also considered things that may be broken, that need to be fixed or at high risk of failure, and we'll create a document that -- that tracks that… Q. Are you responsible for approving the budget each year? A. The budget is approved by the chief financial officer.").

[196] Burke (9/27/2022) Dep. Tr. 31:8-32:24 ("Q. Did it continue on through your retirement, or were there periods where that committee was inactive? A. Well, it continued on. It expanded, actually. Because of the increase in number of individuals using the robot, we had to firm up the credentialing process just because the learning curve is different for general surgeons versus gynecologists versus urologists or anyone that was going to use the robot.").

million in 2018 to a $21.9 million loss in 2021.[197] This was primarily attributed to increased investment costs in ambulatory and specialty clinics, and the effects of COVID-19.[198]

III. THE DA VINCI SURGICAL SYSTEM IS A SINGULAR PRODUCT FOCUSED ON OPTIMIZING PATIENT SAFETY AND OUTCOMES

68. As described in detail below, Intuitive's surgical system should be viewed as a singular economic product for several related reasons:

a. As a threshold matter, both by design and performance, the Intuitive system is composed of interdependent complements in terms of product reliability and, in turn, Intuitive's reputation with doctors, patients, and healthcare providers (Section A). As I explain in greater detail in Section VI below, this interdependence among the components of the da Vinci Surgical System presents a situation where, because of economic efficiency and the avoidance of harmful negative externalities such as free-riding by third-parties and customers, it is natural and optimal for the da Vinci Surgical System to be sold as a singular product.

b. Intuitive designed the da Vinci Surgical System with a "product vision"[199] that can only be achieved by the system as a whole (Section B). Components of the system (such as the da Vinci platform and EndoWrist instruments) are integral to the functioning of the system. Moreover, many of the components (including the EndoWrist instruments at issue) only are used with the da Vinci Surgical System, and the da Vinci Surgical System only uses components that have been manufactured or authorized by Intuitive.

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[197] Public Hospital District No. 1 of King County, Washington, DBA Valley Medical Center (A Component Unit of the University of Washington) Financial Statements June 30, 2021 and 2020 (With Independent Auditors' Report Thereon), accessed January 9, 2023, https://www.valleymed.org/globalassets/valley-medical/media/images/about-us/f_248005d-1a_valleymedicalcenter_fs.pdf, pp.. 3-4. *See also* Public Hospital District No. 1 of King County, Washington, DBA Valley Medical Center (A Component Unit of the University of Washington) Financial Statements June 30, 2019 and 2018 (With Independent Auditors' Report Thereon), accessed January 11, 2023, https://www.valleymed.org/globalassets/valley-medical/media/files/about_us/vmc_audited_fs_year_end_2019.pdf, pp. 5-6.

[198] *Id.*

[199] Intuitive-00270554 at -559. *See also* Azizian et al. at p. 9.

c. From the outset, Intuitive has sold the da Vinci Surgical System as an integrated product (Section C). Moreover, in its public statements and customer contracts, Intuitive has been transparent about the expected lifetime costs associated with the system, which include the capital cost of the da Vinci platform and ongoing costs of the instruments. Although the lifetime costs vary across customers depending on their surgical volumes and procedure categories (e.g., hysterectomies and cholecystectomies), customers are apprised from the outset that they are purchasing a system with costs spread over time.

   i. Intuitive designed the very first da Vinci Surgical System to be sold as an integrated product.

   ii. Intuitive continuously has been selling the da Vinci Surgical System as an integrated product while innovating on various components.

d. Other manufacturers of RAS systems, faced with similar product complementarities and potential for negative externalities, also sell their systems as an integrated product (Section D).

e. Without regard to whether Professor Elhauge's standards for what constitutes separate markets are generally accepted,[200] evidence indicates that those standards are not satisfied in this matter. Hence, even under Professor Elhauge's preferred standards, the da Vinci platform should not be considered separate from system servicing or EndoWrist instruments (Section E).

69. These economic factors and marketplace facts provide strong evidence that, as a matter of economics, the da Vinci Surgical System should be considered as a singular product.

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[200] Phillip E. Areeda, Herbert Hovenkamp, and Einer Elhauge, *Antitrust Law: An Analysis of Antitrust Principles and Their Application, Volume X,* (Boston: Little, Brown and Company, 1996) ("AEH").

A. AS CRITICAL COMPLEMENTS IN QUALITY AND RELIABILITY, THE COMPONENTS OF INTUITIVE'S ROBOTIC SURGERY SYSTEM ARE PROPERLY VIEWED AS A SINGLE PRODUCT

70. A threshold economic question is whether the economic conditions here make it more appropriate to consider Intuitive's surgical system as a singular product rather than the distinct products asserted by Professor Elhauge.[201] To assess this issue at the conceptual level, I first consider (i) whether, due to strong complementarity among its components, it is economically efficient for the da Vinci Surgical System to be sold as a singular product,[202] and (ii) whether there are negative externalities attendant to the sale of Intuitive's system and components (particularly EndoWrist instruments) that further discourage Intuitive from allowing separate sales (by other companies) of components of the da Vinci Surgical System. Here, both factors strongly support the conclusion that Intuitive's surgical system is one product that is sold over time in a surgical solutions marketplace.

1. The da Vinci platform and EndoWrist instruments are complements in the provision of surgical services

71. There is little room to dispute that the da Vinci platform and the EndoWrist instruments are complements in reliability and quality and, hence, both contribute critically to the reputation of da Vinci Surgical Systems.[203] In fact, a review of the factual record confirms that, from the

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[201] Elhauge Report, ¶ 139.

[202] AEH, ¶ 1757b ("While product interdependence brings the defendant an advantage in the complementary market that grows with his power in the primary market, that advantage presumptively reflects a superior complementary product. Punishing such an advantage by calling it a tie subject to the per se rule limits the technological and financial fruits of entering, investing, and innovating in both the primary and complementary markets, thus discouraging all those pro-competitive activities.").

[203] DeSantis (in *Rebotix*) Dep. Tr. 253:1-4 ("A. …Because when it comes to robotic surgery, the trust and quality level to use the platform is paramount. And if you don't have that, it could destabilize the entire platform.").

It is my understanding that all components (including the da Vinci platform and EndoWrist instruments) are integral to the function of the da Vinci Surgical System. *See* Section III.B below for further discussion.

outset, the component parts of the da Vinci Surgical System have been integral to the system's performance and reputation.[204] Hence, as a matter of economics, the da Vinci Surgical System is properly considered a singular product, notwithstanding that sales of instruments occur over time. On the contrary, the reputational complementarity and interdependence exist at all times and remain critical to Intuitive's success as it continues to innovate in the surgical solutions marketplace.

72. As I explain in Section VI, when there is strong complementarity among a product's components, even though the components could be sold separately, it may be economically most efficient to always sell them together, as has been the case with the da Vinci Surgical System.[205] In such situations, keeping the components of the product together can reduce costs and improve quality for consumers.

2. There are obvious and significant negative externalities associated with any non-controlled third-party sale of replacement instruments

73. In economics, a negative externality is a cost or negative effect foisted by one party on another, when the responsible party does not bear the full consequences of those actions.[206] Here, the potential for negative externalities from third-party reset instruments and system servicing is obvious and arises from two related sources. First, third parties do not share the same interest in

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[204] *See* ¶ 34 above.

[205] AEH, ¶ 1757b ("While product interdependence brings the defendant an advantage in the complementary market that grows with his power in the primary market, that advantage presumptively reflects a superior complementary product. Punishing such an advantage by calling it a tie subject to the per se rule limits the technological and financial fruits of entering, investing, and innovating in both the primary and complementary markets, thus discouraging all those pro-competitive activities.").

AEH also acknowledges that "satisfactory complementarity" among third-party products and the alleged tying product is essential for a valid foreclosure claim. *See* AEH, ¶ 1757c ("To show unreasonable foreclosure, of course, plaintiffs must show that rivals make a satisfactory complementary product or would do so absent the challenged product interdependence."). Such "satisfactory complementarity" between third-party products and the da Vinci surgical platform has been disputed by Intuitive. *See* Intuitive-00288975.

[206] Pindyck and Rubinfeld at pp. 661-662.

protecting the quality and reputation of da Vinci Surgical Systems throughout the marketplace and into the future.[207] On the contrary, third parties have a narrow interest in selling reset instruments and limited system servicing to various hospitals, and because Intuitive is the original equipment manufacturer ("OEM") of the da Vinci Surgical System, the effects of any quality failures likely will fall primarily on Intuitive rather than third party companies.[208] This is particularly true here, where some third-parties advertised the interchangeably of its EndoWrist resets with Intuitive's brand-new EndoWrist instruments, writing, "A repaired EndoWrist is not an alternative or replacement device. It is an original da Vinci manufactured device that has been repaired to [its] original specifications."[209] Second, and to a lesser extent, hospitals such as the Plaintiffs that likewise seek to pursue perceived short-term cost savings with purchases of instrument resets from third parties but again without regard to the broader consequences that likely would befall Intuitive in the marketplace should those instruments fail or perform poorly

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[207] Third parties have incentives to protect their own reputation that are not necessarily aligned with Intuitive's business interests (or are not aligned to the same degree as Intuitive). Some reasons are: (1) third parties do not have as much at stake if something goes wrong as Intuitive does; (2) third parties can hurt Intuitive's reputation without harming their own interest by shifting blame for malfunctions on the OEM (i.e., Intuitive); and (3) third parties' personnel can redeploy their resources to do work on medical equipment repairs for other manufacturers.

[208] Three indications that third-party repair companies may not bear the consequences of quality failures are: (1) Restore and Rebotix have claimed "sabotage" and "intentionally inflicted damage," respectively in response to instrument failures following a third-party reset (Restore-00003932, REBOTIX046346_001, and Papit (in *Rebotix*) Dep. Ex. 10); (2) if an entity is remanufacturing the original manufacturer's devices without complying with FDA's requirements for manufacturers, including reporting requirements, then any adverse events associated with the remanufactured instrument would only appear as associated with the original manufacturer (Expert Report of Christy Foreman, MBE, In Re: da Vinci Surgical Robot Antitrust Litigation, Case No. 3:21-cv-03825-VC, January 18, 2023 ("Foreman Report"), ¶¶ 188-189); and (3) Intuitive's RMA data indicate that some reset devices have been returned to Intuitive after failing (Howe Report, ¶ 77).

[209] SIS001684.

in particular instances.[210] In economics, these are classic examples of quality/reputation externalities present here from the outset of Intuitive's entry into the marketplace.

74. These externalities would be less important, of course, if both or one of the component parts of the system were not important to the overall quality and performance of the system—i.e., if the products were not complements. If, for example, the component part at issue does not contribute to the reputation of the producer's overall system, one could see how the independent commoditization of that component may not generate externalities that warrant singular product treatment. In contrast, here, the complementarity and negative externality rationales for Intuitive's marketing its surgical system as a singular product reinforce one another.

B. INTUITIVE DESIGNED THE DA VINCI SURGICAL SYSTEM BASED ON FOUR "PRODUCT PILLARS" THAT ONLY CAN BE ACHIEVED BY THE SYSTEM AS A WHOLE

75. When Intuitive started to develop the da Vinci Surgical System in 1995, it designed the system as an integrated product rather than "distinct" products. Specifically, Intuitive's "product vision" of the da Vinci Surgical System had "four key specifications, or product pillars."[211] The pillars are:

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[210] Although hospitals also need to protect their reputations for patient safety, they are able to continue performing other types of surgeries whereas Intuitive's business is primarily focused on the da Vinci Surgical System (Intuitive 2021 Form 10-K at p. 6-7).

As an example where hospitals seek ways to save on costs and where clinical staff expressed some concern about the third-party servicer; *see*, e.g., Larkin Community Hospital has reached out to third parties such as Revanix for instrument "resetting" due to cost-saving reasons. Gonzalez 30(b)(1) (10/17/2022) Dep. Tr. 14:10-21 ("Q. Okay. Were you involved in discussions with any vendors about the EndoWrist instruments? A. Yes. There were discussions about the instruments. Q. Okay. What were the discussions that Larkin had about – with respect to vendors other than Intuitive about the EndoWrist instruments? A. There was the – the instruments – upon getting Lab Number 10, it was no longer usable, and there was conversations with Revanix to the possibility of resetting the counter and that, therefore, lowered the cost of the procedure."). Dr. Ricardo Estape described the third-party company Revanix as "shady." Estape (10/22/2022) Dep. Tr. 57:13- 59:22.

[211] Intuitive-00270554 at -559.

a. "[f]irst and foremost, the system needed to be reliable and failsafe in order to be feasible as a surgical device;"

b. "the system was to provide the user with intuitive control of the instrument;"

c. "the instrument tips were to have six-degree-of-freedom dexterity as well as a functional gripper;" and

d. the system needed to have "compelling 3D vision."[212]

76. Critically, it is my understanding that the components of the da Vinci Surgical System (such as the da Vinci platform and EndoWrist instruments) are integral to the functioning of the system that supports the "product pillars."

a. For the system to be "reliable and failsafe,"[213] all components are required to meet stringent safety standards and to communicate with the system seamlessly. The safety standards are set by regulatory bodies (such as the FDA, Japanese Ministry of Health, Labor, and Welfare, and the EU).[214] In addition to government regulations, Intuitive conducts its own tests of safety and reliability.[215]

b. To achieve "intuitive" control of the instrument, the surgeon console "blends visualization and instrument control."[216] One example of a way in which the da Vinci Surgical System improves on "intuitive" control is that its hand controllers "mimic the movement of the end-effectors,"[217] similar to how a surgeon's hands may move for open surgery.[218] In contrast, in

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[212] *Id.*

[213] *Id.*

[214] Intuitive 2021 Form 10-K at pp. 14-18.

[215] *See*, e.g., Howe Report, § V.B ("Intuitive Designs and Tests its EndoWrist Instruments to Reliably and Safely Perform Over a Set Number of 'Lives'").

[216] Azizian et al. at p. 9 (Figure 4).

[217] Sally Kathryn Longmore et al., "Laparoscopic Robotic Surgery: Current Perspective and Future Directions," *Robotics* 9, No. 2 (2020): 6 ("Longmore et al.").

[218] Although some robotic assisted surgical systems use "similar hand control interfaces" as the da Vinci Surgical System, other systems choose to imitate the movements of traditional

traditional laparoscopy, the instruments move in the "opposite direction from the surgeon's hands."[219] The da Vinci Surgical System translates the movements by the surgeon at the surgeon console to the instruments, which are attached to the arms of the patient cart.[220]

c. The "dexterity" of the EndoWrist instruments is a signature attribute of the da Vinci Surgical System.[221] This dexterity is made possible through a cable and pulley system.[222] Some of the "degrees of freedom" are found at the end of the instrument (such as "[f]lexion and extension," "abduction and adduction," and "open[ing] and closing"), and others are driven by the robotic arm that is attached to the patient cart ("in and out, pitch, yaw and rotation").[223]

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laparoscopic surgery. TransEnterix's Senhance System is an example of the latter. *See* Longmore et al. at p. 6.

219 Intuitive 2000 Form 10-K at p. 3.

220 Azizian et al. at p. 8 ("The computerized control system extends the surgeon's 'presence' – their sensory awareness and control – into the surgical field by transmitting video images from the endoscopic camera to the stereo viewer of the console, and transmitting the surgeon's hand motions – measured by the master interfaces – to the slave manipulators. Since this is an electronic link, the software of the control system can modify the signals, so as to filter out the surgeon's normal physiological tremor, or to scale down their motions for enhanced precision.").

221 "Da Vinci Instruments – Trusted dexterity," Intuitive Surgical, Inc., accessed January 6, 2023, https://www.intuitive.com/en-us/products-and-services/da-vinci/instruments. *See also* Azizian et al. at p. 15 ("Many of these instruments have an articulated wrist mechanism to allow for dexterous and intuitive tissue interaction, following the surgeon's wrist articulation while controlling motion from the master interfaces of the surgeon console.").

222 Howe Report, ¶ 32.

223 Longmore et al. at p. 14.

d. For 3D vision, the system uses a custom-designed[224] stereoscopic endoscope (which Intuitive categorizes as an accessory of the system),[225] fluorescence imaging, and vision cart (which is part of the da Vinci platform).[226]

77. Further, until 2019, Intuitive's product portfolio centered on the da Vinci Surgical System, and the da Vinci Surgical System continues to be the company's primary system for surgery.[227] And, in all instances, the da Vinci Surgical System uses components that are either manufactured or carefully controlled and authorized by Intuitive.[228] Intuitive does not sell parts to other medical-

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[224] Earlier prototypes of the da Vinci Surgical System used stereo endoscopes produced by Welch Allyn and Olympus, and the endoscope on the final da Vinci Surgical System has "dual optical trains and dual three-chip camera heads" (whereas other endoscopes have a single optical train or two video chips). *See* Intuitive-00270554 at -560-561.

[225] Intuitive 2021 Form 10-K at p. 8 ("Accessory products include sterile drapes used to help ensure a sterile field during surgery, vision products, such as replacement 3D stereo endoscopes, camera heads, and light guides, and other items that facilitate use of the da Vinci Surgical Systems.").

[226] Azizian et al. at pp. 12-13.

[227] In 2019, Intuitive introduced the Ion endoluminal system for "minimally invasive peripheral lung biopsy." "Ion by Intuitive," Intuitive Surgical, Inc., accessed January 12, 2023, https://www.intuitive.com/en-us/products-and-services/ion. *See also* Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2019 ("Intuitive 2019 Form 10-K") at pp. 8, 46 and Intuitive 2021 Form 10-K at p. 6 ("Advanced robotic systems provide precise, powerful systems with high-performance vision extending care team's capabilities to enhance minimally invasive care. These systems include the da Vinci Surgical System, which was designed to enable complex surgery using a minimally invasive approach, and the Ion endoluminal system, which extends our commercial offerings beyond surgery into diagnostic procedures, enabling minimally invasive biopsies in the lung.").

[228] DeSantis (in *Rebotix*) Dep. Tr. 23:23-24:4 ("Q. …Is it your understanding that Intuitive designed the da Vinci robots to only function with instruments that are produced by Intuitive? A. Yes. Q. And that was an intentional design decision; right? A. Absolutely."). *See also* DeSantis (in *Rebotix*) Dep. Tr. 87:9-18 ("Q. Now, when did Intuitive first develop the EndoWrist device for use with the da Vinci surgical platform? A. That was way before my time with the company. It was certainly a core feature of the da Vinci platform, so I would say it goes way back to the beginnings of the company. Q. When you say 'the beginnings of the company,' do you have a general timing sense of when that was? A. In the late '90s, 1990s.").

device manufacturers for use in other systems;[229] the company's mission and sales are focused on its own systems.[230]

78. In sum, Intuitive designed the da Vinci Surgical System as the sum of components, including the da Vinci platform (surgeon console, vision cart, and patient-side cart) and instruments and accessories where the instruments are "used interchangeably during [] surgery" depending on the needs of the specific procedure and surgeon(s).[231]

C. FROM THE BEGINNING, INTUITIVE HAS BEEN SELLING THE DA VINCI SURGICAL SYSTEM AS AN INTEGRATED PRODUCT

79. Intuitive always has sold its product as a surgical system and always has been transparent about the lifetime costs of the system. Specifically, customers are informed from the outset that the system design includes both capital and "smart disposable"[232] components and that their costs would include up-front capital costs associated with the da Vinci platform as well as periodic costs associated with the instruments, accessories, and system servicing.[233] Below, I describe Intuitive's approach at the time of the first da Vinci Surgical System in 1998 through the present.

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[229] *See* Intuitive 2021 Form 10-K at pp. 6-8 for a list of all Intuitive products.

[230] Intuitive 2021 Form 10-K at p. 6 ("Intuitive is committed to advancing minimally invasive care through a comprehensive ecosystem of products and services.")

[231] Intuitive Surgical Form 10-K For the Fiscal Year Ended December 31, 2001 ("Intuitive 2001 Form 10-K") at pp. 4-5; Intuitive 2021 Form 10-K at p. 6-8.

Interchangeable instruments were a "re-design" for the second prototype (named "Mona," which was the first prototype that was tested in human surgery) prior to the commercialization of the da Vinci Surgical System. The interchangeable instruments was a "key feature missing in the Lenny prototype and essential for first human use. It meant not only that the system could accommodate many different styles of instruments for different surgical tasks, but also that these instruments could be separated from the non-sterile robotic manipulators and sterilized independently." *See* Intuitive-00270554 at -561-562.

[232] Intuitive 2001 Form 10-K at p. 4.

[233] *See*, e.g., Intuitive-00005135, § 8 (on Instruments and Accessories) and § 9.2 (on Pricing and Payment Terms of Services).

1. Intuitive designed the da Vinci Surgical System to be sold as an integrated product

80. Intuitive's historical Form 10-K filings show that Intuitive has sold an integrated system since at least 2001, and I am aware of no evidence that Intuitive ever separately sold the components of a da Vinci Surgical System. In its 2001 Form 10-K, Intuitive stated that its "*da Vinci* Surgical System consists of a surgeon's console, a patient-side cart, a high performance vision system and our proprietary instruments."[234] Intuitive characterized the system as "an advanced surgical system that we believe represents a new generation of surgery – the third generation," where open surgery and minimally invasive surgery are the two prior generations.[235] As of 2001, Intuitive had sold 89 systems[236] and recorded net losses of $16.7 million.[237] Although the company had not yet had a year ending with positive net income,[238] Intuitive chose to offer an integrated system (i.e., the da Vinci Surgical System) that would serve as an alternative method of performing surgery.

81. Intuitive is transparent in the expected costs that are associated with its systems, including a predictable increase in costs for increased scope of application or increased surgical volumes. First, Intuitive clearly states that EndoWrist instruments are "smart disposables" that are "resterilizable and reusable for a defined number of procedures or hours of use."[239] An EndoWrist instrument should not be "used for more than the prescribed number of procedures or hours so that its performance meets specifications during each procedure. In addition, [Intuitive] can sell the instrument for a fixed number of uses or hours and effectively price [its] EndoWrist instruments on a per-procedure or per-hour basis."[240]

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234 Intuitive 2001 Form 10-K at p. 3 (italics in original). *See also* Intuitive 2000 Form 10-K at p. 1.

235 Intuitive 2001 Form 10-K at p. 3.

236 *Id.*

237 Intuitive 2001 Form 10-K at p. 19.

238 *Id.*

239 Intuitive 2001 Form 10-K at p. 5.

240 *Id.*

82. Second, Intuitive has always made clear that, although the majority of its revenues in the early years came from the sales of the da Vinci Surgical System (consisting of "a surgeon's console, a patient-side cart, a high performance vision system and proprietary instruments"), the company expected that its share of revenues from EndoWrist instruments and service would increase over time.[241] This is because Intuitive would receive "recurring revenue through sales of the EndoWrist instruments and accessories and ongoing service" over the "useful life of each installed da Vinci Surgical System."[242] Customers that entered into an agreement with Intuitive were informed that there would be costs associated with the da Vinci platform and instruments the future, depending on their scope and level of use.[243]

2. Intuitive continuously has been selling the da Vinci Surgical System as an integrated product while innovating on various components

83. Since 2001, Intuitive has developed four "generations" of da Vinci platforms and a wide variety of EndoWrist instruments.[244] For example, among other innovations relative to its predecessors, the da Vinci Xi System (which is the fourth generation) allows healthcare providers to work "much deeper or much farther into the body," and all components—including the platform and

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[241] Intuitive 2001 Form 10-K at p. 16.

[242] *Id.*

[243] For example, in a model shared with Phoenixville Hospital, in the "Reinvestment ROI" tab, the contribution margin for the hospital per procedure is estimated as a function of instrument, accessory, and operating room costs (Intuitive-00001639). *See also* "Discovery and Bus. Plan Inputs" and "FinancialProforma" tabs (Intuitive-00001639).

[244] *See* ¶ 28 above and McGrogan (in *Rebotix*) Dep. Tr. 15:7-20 ("Q. Have those model numbers evolved over the years? A. There are various models of da Vinci that have come out. IS1200 was the first one, then IS2000, then IS3000, then IS4000, then IS4200. That's at least a multiport robot sort of generation. Q. And you tell me which da Vinci robot each of those numbers corresponds to? A. Oh. I think the IS1200 is referred to as the standard. …IS2000 is referred to as the da Vinci S. IS3000 is the da Vinci Si. IS4000 is the da Vinci Xi. And IS4200 is the da Vinci X."); Longmore et al. at p. 13 on da Vinci instruments ("Due to being commercially available for twenty years, the da Vinci RAS system has the largest library of end effectors available of all RAS systems (Table 5. Instruments). Not only does the da Vinci RAS system have the largest variety of end effector types, it also has a large variety of each type of end effector. For example, da Vinci has twelve different forceps available for the surgeon to choose from.").

instruments—needed to "evolve" with the new system.[245] Evidence indicates that Intuitive's innovations provide surgeons with more control, precision, and choice over how to perform surgery.[246]

84. While Intuitive has innovated on the da Vinci Surgical System over the past two decades, the company continues to sell the system as an integrated product (including the platform, instruments, and servicing) as it had with its first system in 1998.[247] In its sales, licensing, and servicing agreement ("SLSA") with customers and public filings, Intuitive has been transparent about its policies regarding EndoWrist instruments and service of the da Vinci System:

a. By signing the SLSA, customers expressly acknowledge that the "System is designed for use only with the Instruments and Accessories"[248] and that "Intuitive does not have an obligation to provide Services (1) on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by

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[245] McGrogan (in *Rebotix*) Dep. Tr. 79:9-21 ("A. The -- the platforms had different surgical goals. The Xi had expanded goals for surgery that the Si platform didn't have. And that drove, amongst other things, a lengthening of the instrument as a primary requirement, which made – and lengthening means working deeper in the body. So we wanted to enter at one port location and work much deeper or much farther into the body, and that drove for a longer instrument. And that, among other requirements, made us evolve the platform, the robot, and the instrument to go along with it.").

[246] *See*, e.g., "About the da Vinci Surgical System," UC Health, accessed January 6, 2023, https://www.uchealth.com/services/robotic-surgery/patient-information/davinci-surgical-system/ ("Robotic-assisted surgery with the da Vinci Surgical System allows surgeons to perform complex minimally invasive surgical procedures with precision and accuracy. The system is an advanced robotic platform designed to expand the surgeon's capabilities and offer an option to open surgery.").

[247] *See* fn. 43 above.

[248] LARKIN-00025488 ("Use, License & Service Agreement" between Intuitive and Larkin Community Hospital dated June 9, 2017), § 5.2(E) ("The System is designed for use only with the Instruments and Accessories. If Customer uses the System with any surgical instrument or accessory not made or approved by Intuitive, Intuitive may discontinue Services, and any warranties applicable to any Services provided prior to any discontinuance will be void."). The agreement defines "Instruments and Accessories" as "instruments or accessories made or approved by Intuitive for use with the System." LARKIN-00025488, § 2.3. *See also* VMC-00020652 ("Sales, License, and Service Agreement" between Intuitive and Valley Medical Center signed on August 31, 2018), § 5.2(E).

Intuitive or (2) which are either necessary or desired as a direct or indirect result, in whole or in part, of unauthorized repair, modification, disassembly, alteration, addition to, subtraction from, reconfiguration, or misuse of the System."[249] Customers also acknowledge that they "will not, nor will Customer permit any third party to, modify, disassemble, reverse engineer, alter, or misuse the System or Instruments and Accessories."[250] Such provisions concerning the use of the system and instruments have been included in the agreements since 1999.[251]

b. In its Form 10-Ks, Intuitive states that it offers a variety of instruments "customized for various surgical procedures."[252] In addition, instruments have a "programmed memory chip" that informs "how the da Vinci system and instruments work together. In addition, the chip will generally not allow the instrument to be used for more than the prescribed number of procedures to help ensure that its performance meets specifications during each procedure."[253] This language has remained consistent since 2001.[254]

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[249] LARKIN-00025488, § 5.2(A) ("Intuitive does not have an obligation to provides Services (1) on any System where installation, repair, or adjustments have been made by an individual other than an Intuitive technician or an individual approved by Intuitive or (2) which are either necessary or desired as a direct or indirect result, in whole or in part, of unauthorized repair, modification, disassembly, alteration, addition to, subtraction from, reconfiguration, or misuse of the System, or negligence or recklessness on the part of Customer."). *See also* VMC-00020652, § 5.2(A).

[250] LARKIN-00025488, § 3.4 ("Customer will not, nor will Customer permit any third party to, modify, disassemble, reverse engineer, alter, or misuse the System or Instruments and Accessories.") and VMC-00020652, § 3.4.

[251] *See*, e.g., Intuitive-01524447 ("Master Purchase and Master Service Agreement" between Intuitive and Beth Israel Medical Center dated October 15, 1999), §§ 3.2(c)-(d) and 2.4(b); and Intuitive-01291299 ("Sales Agreement" between Intuitive and Pitt County Memorial Hospital dated October 20, 1999), §§ 3.2(c)-(d) and 2.4(b).

[252] Intuitive 2020 Form 10-K at p. 7.

[253] *Id*.

[254] Intuitive 2001 Form 10-K at p. 5 ("A custom computer chip inside each instrument performs several functions that help determine how the system and instruments work together. …In addition, the chip will not allow the instrument to be used for more than the prescribed number of procedures or hours so that its performance meets specifications during each procedure."); Intuitive 2021 Form 10-K at p. 8 ("A programmed memory chip inside each instrument performs several functions that help determine how the da Vinci system and instruments work together. In addition, the chip will generally not allow the instrument to be

c. Intuitive's Form 10-K also describes its business model. In 2001, the company disclosed that "[d]uring the useful life of each installed *da Vinci* Surgical System, we expect to generate recurring revenue through sales of the EndoWrist instruments and accessories and ongoing service."[255]

85. Evidence indicates Intuitive has always been transparent regarding its pricing for EndoWrist instruments, including during its initial system contracting.[256] Nonetheless, it is evident in Intuitive's sales data that the particular instruments purchased by customers depend on the levels and nature of the specific surgeries being performed.

86. As shown above, Intuitive marketed the da Vinci Surgical System as an integrated product with various instruments that may be used depending on surgery type and then (once any applicable usage limit is met) need to be safely replaced by Intuitive. Moreover, Intuitive's public descriptions of the da Vinci Surgical System are consistent with the creation and sale of an integrated surgical system as a whole.[257]

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used for more than the prescribed number of procedures to help ensure that its performance meets specifications during each procedure.").

[255] Intuitive 2001 Form 10-K at p. 16.

[256] *See*, e.g., Intuitive-00279920, Intuitive-00279923 ("Da Vinci Si, Instrument & Accessory Catalog With Pricing in US Dollars," February 2018), and Intuitive-00279958 ("Da Vinci X and Da Vinci Xi, Instrument & Accessory Catalog with pricing in US dollars," January 2018). Intuitive analyzed OU Medicine's average instruments and accessories ("I&A") cost per procedure and noted that "[t]here is no fundamental difference in cost between Si and Xi on like items" (Intuitive-00279920 at -921). Intuitive also enclosed its "current online instrument catalogs which should provide more clarity" (Intuitive-00279920 at -920). As discussed in Section V.B below, Intuitive's I&A sales data confirms that the majority of customers pay the same price for a specific instrument and that instrument prices have not been increasing over time.

[257] *See, e.g.,* Intuitive 2021 10-K at p. 88 ("The systems consist of a surgeon console or consoles, a patient-side cart, a high-performance vision system, and proprietary instruments and accessories.").

D. OTHER MANUFACTURERS OF ROBOTIC ASSISTED SURGICAL SYSTEMS ALSO SELL THEIR SYSTEMS AS INTEGRATED PRODUCTS

87. Professor Elhauge asserts that "[i]f it is common for some firms not to bundle the items even in *non*competitive markets, that also indicates that it is efficient not to bundle the items. . . ."[258] And that "[i]n contrast, the fact that firms with market power do bundle two items does not provide any indication about the efficiency of doing so. . . ."[259] And "[f]inally, if a dominant firm bundles two items and the competitive fringe within that same market does not, then that suggests the two items are separate products because the competitive fringe firms would have economic incentives to bundle the items if it were efficient to do so."[260] He then concludes that "[i]n this case, unbundling has been common within the U.S. MIST surgery robot market, which supports a conclusion that the products are in separate markets."[261]

88. I disagree with Professor Elhauge's characterization of the components of Intuitive's surgical system as separate based on the business decisions of some of Intuitive's competitors. First, Professor Elhauge admits that his conclusions hinge on the significance of Intuitive's market power.[262] Therefore, it should be compelling that Intuitive has always sold the components of its surgical system as a singular product in the United States, including before it plausibly had sufficient market power to cause anticompetitive harm.[263] Moreover, evidence shown in subsequent sections of this report indicates that Intuitive continually has competed with alternative surgical solutions in the years since it launched.[264] Second, as I show in the remainder of this section, several of Intuitive's competitors do, in fact, partially or fully bundle their surgical solution, indicating efficiency from doing so.

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[258] Elhauge Report, ¶ 153.

[259] *Id.*

[260] *Id.*

[261] Elhauge Report, ¶ 154. *See also* Elhauge Report, ¶ 206 ("When separating products is feasible and desired by some buyers, that many firms in similar markets sell them separately indicates that the tying and tied products are 'separate,' and would so indicate even if some other firms did bundle them together.")

[262] Elhauge Report, ¶ 153.

[263] *See* Section III.C above.

[264] *See*, e.g., Section IV.D and Sections V.A-V.D below.

89. Intuitive's decision to sell the da Vinci Surgical System as an integrated product is not unique in the medical device industry. In particular, there are other manufacturers of RAS systems facing the same component complementarities and negative externalities, which also choose to sell their surgical systems as integrated products, including systems that so far have significantly fewer sales than Intuitive—e.g., CMR Surgical.

90. Similar to Intuitive, CMR Surgical sells a "closed system" (i.e., systems that have specifically designed instruments and are not compatible with other instruments) with usage limits on instruments. CMR Surgical manufactures the Versius Surgical Robotic System ("Versius System") for minimally invasive surgeries.[265] The company was founded in 2014 and currently has regulatory approval in the UK, EU, India, and Australia.[266] As of June 2020, CMR had sold nine systems in the UK and India.[267] The Versius System only uses "surgical instruments and consumables specifically designed for the Versius System… as the Versius System is a closed system,"[268] and instruments have a maximum usage of 13 procedures.[269] Although CMR Surgical has far fewer installations than Intuitive to date, the company decided to sell an integrated system with instruments that were specifically designed for it and that had usage limits.

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[265] CMR-00001108, ¶ 2.
[266] CMR-00001108, ¶ 4.
[267] CMR-00001108, ¶ 5.
[268] CMR-00001108, ¶ 3.
[269] CMR-00001108, ¶ 9.

91. From an economic perspective, that Intuitive (and other medical device manufacturers) exclusively sell "closed systems" indicates that such integration is efficient for both sellers[270] and buyers,[271] and thus, to forcibly dismantle this process will introduce inefficiencies in the market.

92. Professor Elhauge also claims that "Intuitive itself has not tied da Vinci robots to da Vinci servicing in at least some foreign markets."[272] And that "[s]uch evidence strongly indicates that efficiencies did not drive Intuitive's tying of da Vinci robots to servicing in the U.S. market[.]"[273] First, Professor Elhauge fails to recognize evidence that Intuitive's relationships with third parties in foreign countries are tightly controlled by Intuitive. Intuitive provides significant training to its third-party business partners.[274] In effect, Intuitive's third-party partners act as an extension of Intuitive where it is less efficient for Intuitive to provide the service itself in certain geographies.[275] These relationships significantly differ from the actions that third parties have taken in the U.S., which have been completely out of Intuitive's control.

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[270] AEH, ¶ 1744e ("[T]he market test also suggests that the efficiency of unbundling may vary for different types of firms. Some may find it inefficient ever to unbundle. If the defendant falls into this category of firms, forbidding his bundling may force him into inefficiency needlessly.").

[271] AEH, ¶ 1744e ("[C]ommon bundling can mean that bundling is efficient for many buyers, and that the defendant's choice not to offer the items unbundled reflects a mere market choice to target such buyers").

[272] Elhauge Report, ¶ 207.

[273] *Id.*

[274] Mohr (11/7/2022) 30(b)(6) Dep. Tr. 29:12-19 ("Q. And do you have an understanding of which foreign markets they may be repaired by third parties in? A. Specifically, I don't recall, but generally it was in markets where we have distributors that we have specifically trained on repair of systems in order to ensure that the quality of what they were doing was commensurate with our need.").

[275] In its 2018 annual report, Intuitive describes the risks associated with these third-party relationships. *See* Intuitive-00319903 at -931 ("difficulty in establishing, staffing, and managing OUS operations" and "the expense of establishing facilities and operations in new foreign markets."). *See also* Intuitive-00319903 at -931 ("We have strategic relationships with a number of key distributors for sales and service of our products in certain foreign countries. If these strategic relationships are terminated and not replaced, our revenues and/or ability to sell or service our products in the markets serviced by these distributors could be adversely affected").

93. Second, Professor Elhauge interprets Intuitive's use of third-party partners for da Vinci service in foreign countries as an indication that Intuitive's selling its surgical system as a singular product in the U.S. does not have efficiency justifications.[276] Professor Elhauge's conclusion is arbitrary and divorced from any economic analysis of Intuitive's competitive behavior across geographies. There are many reasons unrelated to anticompetitive conduct why a company may choose to sell components of a product as a bundle in one geography while unbundling one or more components of the product in another geography, including, for example, (i) local regulations, (ii) localized expertise, (iii) scale of operation, and (iv) differences in customer demands. In the absence of further information, the more natural conclusion from Intuitive's different choices of go-to-market strategies across geographies is that selling an integrated product is most efficient in some countries, while contracting with third parties for system servicing is most efficient in others.

94. It is worth noting that there are also differences in the business models employed by manufacturers of RAS systems and that these differences are a dimension along which the systems can compete. Whereas Intuitive and CMR Surgical generally have "closed" systems with specifically designed instruments, Medrobotics and TransEnterix[277] (manufacturer of the Senhance Surgical System) promote their "open architecture" that allows third-party instruments to be used with their systems.[278] However, it is unclear how open the Medrobotics system

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[276] Elhauge Report, ¶ 207.

[277] TransEnterix changed its name to Asensus Surgical as of March 5, 2021. *See* "TransEnterix Announces Name Change to Asensus Surgical and Introduces a New Category of Surgery, Performance-Guided Surgery," Business Wire, February 23, 2021, accessed January 6, 2023, https://www.businesswire.com/news/home/20210223005444/en/TransEnterix-Announces-Name-Change-to-Asensus-Surgical-and-Introduces-a-New-Category-of-Surgery-Performance-Guided-Surgery. Because the company is referred to as "TransEnterix" in the documents in this case, I will refer to it as "TransEnterix" in my report.

[278] "Flexible 'open architecture' instrumentation," Medrobotics, accessed January 6, 2023, https://www.easmed.com/surgical-robot-flex-system/; "The Senhance Surgical System is the first and only digital laparoscopic platform," Senhance, accessed January 6, 2023, https://www.senhance.com/us/digital-laparoscopy. *See also* Asensus Surgical Form 10-K For the Fiscal Year Ended December 31, 2020 at p. 9 ("We also have designed the Senhance System so that third- party manufactured instruments can be easily adapted for use.").

actually will be in practice, as, at least with one customer, Medrobotics holds the option to terminate an agreement "if UMMC uses the system with any accessory not made *or approved by* Medrobotics" or if "UMMC tampers with or alters the system, software of any accessories" and does not address the issue within 30 days of written notification from Medrobotics.[279] Another differentiating factor of the Senhance System that TransEnterix highlights is that instruments for the system have "no hard limit to the number of times an instrument may be reused."[280] Of note, Medrobotics' Flex and TransEnterix's Senhance are identified as a rival MIST surgery robot systems by Professor Elhauge.[281] These examples show that manufacturers choose business models that work best for their products and competitive position and that differences in these arrangements are a way in which they compete.

95. As a matter of economics, the similarities in system-product designs—like Intuitive's and CMR Surgical's—confirm that some robotic platforms, instruments, and service are so interdependent in terms of product design, quality, and performance that they should be considered as one product as a whole.

E. PROFESSOR ELHAUGE'S PREFERRED STANDARDS FOR SEPARATE MARKETS ARE NOT SATISFIED

96. Professor Elhauge asserts that sales of da Vinci platforms are "separate" from "EndoWrist repair and replacement" and from "da Vinci service" based on three pieces of purported "economic evidence":

a. "it would be feasible to sell the products separately";

b. "many hospitals find it desirable to obtain the products separately"; and

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[279] "Board Book," Mississippi Board of Trustees of State Institutions of Higher Learning, January 17, 2019, accessed January 7, 2023, http://www.ihl.state.ms.us/board/downloads/boardbooks/1901.pdf p. 37 (emphasis added).

[280] Longmore et al. at p. 15. Senhance is the only system among the six systems listed in the article's Table 5 (including da Vinci Xi and da Vinci Single Site) that has "infinite" instrument reusability.

[281] Elhauge Report, ¶ 125.

c. "the challenged tie is *not* commonplace in other markets."[282]

97. In Sections A-C and D above, I address Professor Elhauge's first and third claims, respectively. In this section, I focus on Professor Elhauge's second claim and show that Professor Elhauge's analysis is inconsistent with the analysis proposed in his book, which he cites in his expert report.[283]

98. As Professor Elhauge acknowledged in his book, the existence of customer demand for items in a bundle to be sold separately is not, in itself, sufficient to show that they should be viewed as separate products.[284] Although "any definition of uncommon is arbitrary," Professor Elhauge and coauthors "suggest" a rule of thumb that "if less than 10 percent of the tying item is sold unbundled in the competitive market analogue, then the items are a single product."[285]

99. Setting aside the merits of Professor Elhauge's "rule of thumb," the facts of the case do not support that the proposed threshold would be met:

a. First, the components of the da Vinci Surgical System have not been sold separately since Intuitive began selling the system around 1999.[286] Instead, the da Vinci System has always been sold as an integrated product.

b. Second, evidence in the case indicates that, without 510(k) clearance from the Food and Drug Administration ("FDA"), hospitals and surgeons would be reluctant (or potentially unwilling) to use third parties' EndoWrist reset "services." For example, hospital administrators at Valley Medical Center, Larkin Community Hospital, and Franciscan Alliance stated that their hospitals do not purchase medical equipment that required FDA clearance and did not

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[282] Elhauge Report, ¶ 143 (on "EndoWrist repair and replacement") and ¶ 199 (on "da Vinci service").

[283] *See*, e.g., Elhauge Report, ¶ 142.

[284] AEH, ¶ 1744d ("That some idiosyncratic buyers sufficiently prefer the items separately to support the extra costs of separate production and distribution does not mean buyers generally prefer the items separate.").

[285] AEH, ¶ 1744d.

[286] *See* Section III.C.2 above.

have it.[287] Similarly, administrators at hospitals that purchased reset EndoWrist instruments from Rebotix stated that they "would [not] do business with an organization that… doesn't have FDA clearance, at least knowingly."[288] Surgeon testimony also confirms that they expect that the medical devices that they use in surgery to have been cleared by the FDA.[289]

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[287] *See*, e.g., Teal 30(b)(6) (11/18/2022) Dep. Tr. 37:17-25 ("[A.] As a practice, we would -- if the FDA requires a device to be cleared, we would -- we would purchase a cleared device, if that's the question. Q. It -- your word is better than mine, so it is a practice at Valley that if a device requires FDA clearance, that it be cleared before it be purchased? A. Correct."); Early (10/6/2022) Dep. Tr. 58:13-18 ("Q. And am I right that -- does Lar- -- does Larkin have a policy that a medical device that has not been cleared by the FDA should not be used by the hospital? …A. To the best of my knowledge, yes."); Schimmel 30(b)(6) (11/16/2022) Dep. Tr. 51:24-52:8 ("Q. So for example, if a device is single use but has been remanufactured to be reused and the single use device required FDA clearance, would Franciscan purchase the remanufactured device if it lacked FDA clearance? …[A.] We would not purchase a device that wasn't FDA cleared, that we were aware of.").

[288] Donovan (in *Rebotix)* Dep. Tr. 132:7-11 ("Q. What about FDA clearance, is that an issue that ever arises? A. I mean, I don't think we would do business with an organization that I'm aware of that doesn't have are FDA clearance, at least not knowingly.") and Harrich (in *Rebotix*) Dep. Tr. 154:5-11 (A. Having the FDA backing to reprocess or reprogram those chips is an important factor for us. Q. And why was that an important factor for Pullman? A. Well, we like to stay with FDA approval on everything we're using and doing."). *See also* ¶ 245 below.

[289] *See*, e.g., Francis (10/14/2022) Dep. Tr. 23:22-24:10. ("Q. Would you be willing to use an EndoWrist with a circumvented use counter on a patient? …A. No. Q. Why not? A. From what I understand, the number on a repeated use instrument is placed there within a recommendation based on…the engineers or elsewhere, that stated that was a normal number of uses that would basically give you normal use of the instrument. To go beyond that does not guarantee or in any way imply the instrument will continue to work as designed…"). *See also* Estape (10/22/2022) Dep. Tr. 57:18-58:7. ("Q. What do you remember about the meeting? A. Well, a company comes in and says that it can wipe out the number of uses on an instrument that's FDA cleared for only ten uses, I thought that was a pretty interesting meeting. Q. Why was it interesting to you? A. Well, you know, everything that we do in medicine is for safety, you know, and certain things are cleared only by the FDA, and it just seemed like…a very shady meeting where, you know, oh, I can take this and I can wipe off the uses for this instrument and you can keep using it forever. It just didn't seem -- you know, it didn't seem like a very up-and-up program. I've never heard of that before."); Estape (10/22/2022) Dep. Tr. 59:18-22. ("A…I'm not willing to do anything that's not FDA approved because, you know, anything that happens to the patient, they're going to come down on me for having used equipment that was not FDA approved at that time."); Maun (11/8/2022) Dep. Tr. 27:7-28:18.

100. Instead, Professor Elhauge's evidence on hospital "demand" is largely based on a select number of hospitals that purchased third-party resets despite the fact that none of the reset EndoWrist instruments had FDA clearance at the time of purchase.[290] Professor Elhauge presents the fact that Intuitive sent letters informing hospitals (that had purchased reset EndoWrist instruments) of the risks to safety as being evidence of hospital "demand" because "there would have been no rational economic reason to make such warnings and threats."[291]

101. Contrary to Professor Elhauge's assertion, there is ample evidence of Intuitive's consistent concern and focus on patient safety, some of which I highlight in this report.[292] And, as a matter of economics, Intuitive has legitimate reason to be concerned that third-party companies will not share their level of concern. That is, Intuitive's letter is an attempt to address the "principal-agent problem"—which I discuss in more detail in Section VI.B—and articulate the risk to patient safety, which ultimately has the potential to harm Intuitive's reputation.[293] The "principal-agent problem" is one of the reasons why companies like Intuitive may seek to bundle components of the system as an integrated product.[294]

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[290] Elhauge Report, ¶¶ 149, 152.

Professor Elhauge also discusses evidence that purportedly shows that "[m]any other hospitals indicated their interest in purchasing EndoWrist repair from Intuitive's rivals if they had been given the choice." Elhauge Report, ¶ 151. However, the evidence that Professor Elhauge describes consist of (1) a February 2020 analyst report published by Deutsche Bank for which neither the report nor the testimony of the report's lead author provide specific sources behind its statements; (2) the testimony of Mr. Parker, who is an interested party in a lawsuit against Intuitive; and (3) the testimony of Mr. Colletti from Medline. None of these demonstrated the likelihood that the hospitals would purchase and use reset EndoWrist instruments.

[291] Elhauge Report, ¶ 152 and Intuitive-00373885 (Intuitive letter to Marin General Hospital detailing that "[e]xtended [i]nstrument [u]se [c]an [i]mpact [p]roduct [p]erformance and [p]atient [s]afety").

[292] *See*, e.g., Section VI.B.1 below.

[293] For example, in Intuitive's letter to Marin General Hospital, Intuitive describes multiple ways in which extended instrument use and "service" by third parties could "affect the operation of the [i]nstrument thereby jeopardizing patient safety." *See*, e.g., Intuitive-00373885.

[294] *See* Section VI.B.

102. Intuitive's consistent commitment to selling the da Vinci Surgical System, including its defense of its contractual provisions, reflects a high level of concern about the disintegration of the system. Given its level of concern, one might expect that in a but-for world where Intuitive cannot achieve da Vinci Surgical System integration through contractual provisions, it would attempt to achieve a similar level of system integration through other means, such as alternative pricing structures. Hence, it is highly uncertain (or unlikely) that third-party companies would achieve a 10 percent share of EndoWrist "repair and replacement" sales in the relevant but-for world.

IV. THE RELEVANT MARKET IN WHICH INTUITIVE COMPETES MUST INCLUDE LAPAROSCOPIC AND OTHER SURGICAL SOLUTIONS

A. THE PROPER ANALYTICAL FRAMEWORK FOR ASSESSING INTUITIVE'S ALLEGED MONOPOLY POWER

103. In considering Professor Elhauge's proposed fore market and alleged monopoly power of the da Vinci platform, it is important first to understand the proper economic framework and principles that should inform such an inquiry.[295] This is particularly important here, where those making purchasing decisions (healthcare providers, surgeons, and patients) are choosing among significantly differentiated surgical solutions, and doing so on a life-cycle cost basis.

104. Ultimately, the economic question of Intuitive's asserted monopoly power is whether these customers, in considering Intuitive's surgical solution, have competitive options that effectively constrain Intuitive's competitive behavior—i.e., to ensure that Intuitive must compete to win and keep business. This assessment centers on the time and context of contracting, and in particular consideration of those products that are Intuitive's closest competitors, and whether those options for the customer have a constraining effect on Intuitive's competitive behavior. The

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[295] Although I do not explicitly address Professor Elhauge's claim that "Intuitive's contracts impose two other ties ("incontestable da Vinci servicing" with "contestable da Vinci servicing" and "all da Vinci servicing" with "EndoWrist repair or replacement"), my analysis also applies to other tying relationships in the Elhauge Report. Elhauge Report, ¶ 255.

assessment must also consider whether there are constraining effects that continue over each year of a customer's lifetime as a da Vinci Surgical System customer as well.

105. In assessing the allegations in this case of an extension of monopoly power in one relevant market to achieve monopoly power in another, we have the benefit of being able to look at what historically has influenced Intuitive's competitive decision-making, and whether Intuitive's competitive behavior meaningfully has changed in a way that reflects increased monopoly power as its sales of surgical systems have grown. This analysis involves an evaluation of the competitive constraints Intuitive faced when it first developed and marketed the da Vinci Surgical System, as well as how those competitive constraints have evolved over time. For example, two key considerations here are (i) whether, as it succeeded, Intuitive raised prices to extract surpluses that reflect monopoly power (i.e., well beyond those necessary for Intuitive's expected revenues to exceed its investment and operational costs); and (ii) whether Intuitive "price discriminated" where its product was most in demand and thus arguably it had the most market power. If neither of these features of anticompetitive conduct is evident, it is a strong indication that Intuitive remained competitively constrained, even as it achieved commercial success—winning competitions is evidence of competition, not the lack thereof.

106. As I describe below, evidence supports a surgical solutions marketplace in which Intuitive's surgical system is one among other competitive options for hospitals and where Intuitive is particularly focused on competition with its closest substitutes—laparoscopic and open surgeries. The only rational economic conclusion is that both at its origin, and now, Intuitive's surgical solution is not effectively its own "market;" nor is there evidence that it has any more power to impose an anticompetitive tying arrangement today than it did when it first came to market. Instead, evidence shows that Intuitive continually has innovated and competed to win and retain business, and has not acted as a monopolist of surgical solutions.

B. SURGICAL SOLUTIONS ARE DIFFERENTIATED PRODUCTS

107. Surgical solutions, including the da Vinci Surgical System, are what economists refer to as differentiated products. These are products that are substitutable for one another, and may be

highly substitutable for one another, but they are not *perfect substitutes*.[296] The demand for a particular differentiated product depends on the specific characteristics the product offers as well as consumers' specific preferences, tastes, and needs for these characteristics.[297] There are several characteristics that differentiate the da Vinci Surgical System from other surgical solutions, and make it a particularly attractive substitute for many other options, including: (i) its record of patient safety; (ii) its prevalence in academic and clinical research; (iii) the precision of the system including its EndoWrist instruments; (iv) the degree of precision and dexterity offered to surgeons while operating the system; (v) the number of surgical procedures that have been approved for use with the system; (vi) the available surgeon training and simulation programs available for surgeons; and (vii) Intuitive's 24-hour surgeon support hotline.[298]

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[296] Pindyck and Rubinfeld at p. 452 (emphasis added).

[297] *See*, e.g., Pindyck and Rubinfeld at pp. 455-56.

[298] *See* "About the da Vinci Surgical System," UC Health, accessed January 6, 2023, https://www.uchealth.com/services/robotic-surgery/patient-information/davinci-surgical-system/ ("The da Vinci System has been successfully used in tens of thousands of procedures. Its safety and efficacy are documented in clinical publications and the literature supporting its use is extensive."). The da Vinci Surgical System has appeared in over 22,000 peer-reviewed publications in various clinical journals since 1998. *See* "Clinical Evidence," Intuitive Surgical, Inc., accessed January 6, 2023, https://www.intuitive.com/en-us/about-us/company/clinical-evidence. Intuitive offers a comprehensive suite of stapling, energy, and core instrumentation for the surgical systems. "Inspired by the human hand, our wristed instruments enable surgeons to orient the instruments carefully relative to the tissue and suture with precision, just as they can in open surgery." *See* Intuitive 2021 Form 10-K at p. 4. The da Vinci Surgical System offers many benefits and features like immersive 3DHD visualization, precise and tremor-free endoscope control, and scaled, tremor filtered instrument movement to offer a high degree of precision and dexterity. *See* Intuitive 2021 Form 10-K at pp. 6. Da Vinci Surgical Systems are cleared to perform cardiothoracic surgery, general surgery, gynecologic surgery, head and neck surgery, and urologic surgery. *See* Intuitive 2021 Form 10-K at pp. 8-10. Intuitive offers online learning, simulation and hands-on training for da Vinci technology. *See* Intuitive 2021 Form 10-K at pp. 5, 11. Intuitive offers 24x7 worldwide technical system support for da Vinci Surgical Systems. *See* Intuitive 2021 Form 10-K at p. 9. *See,* "Da Vinci Support," Intuitive Surgical, Inc., accessed January 10, 2023, https://www.intuitive.com/en-us/about-us/contact/da-vinci-support. *See also* Bernier (11/7/2022) Dep. Tr. 15:6-16 ("Q. You mentioned previously that your preference for all patients is to offer a robotic approach. Why is that? A. Because, in my experience, they have less pain, quicker return of bowel function, shorter length of stay, and, in general, recover better. I also find that my dissection can be more accurate and my

108. What matters for assessing the asserted relevant fore market from an economic perspective is whether the demand for the da Vinci significantly is affected and constrained by the potential for substitution to other surgical solutions. It is well-recognized in economics that, as a differentiated product, the da Vinci Surgical System can face vigorous competition from other, differentiated, surgical solutions, including laparoscopic and open surgeries. I show below that the relevant product market for assessing Intuitive's competitive focus, including the conduct at issue in this matter, necessarily includes those other surgical modalities and systems. As I discuss below, the demand for the da Vinci Surgical System is "derived" from the demand for surgeries, and the closest competition to the da Vinci since its inception for those surgeries has come from surgeries performed laparoscopically, where da Vinci has always competed vigorously and must continuously do so to win over and maintain demand from hospitals, doctors, and patients.

C. THE DEMAND FOR DA VINCI SURGICAL SYSTEMS IS DERIVED FROM THE DEMAND FOR SURGERIES AND OPTIONS AVAILABLE TO HOSPITALS, SURGEONS, AND PATIENTS

109. Surgeries that can be performed either with the da Vinci Surgical System or with other surgical solutions and modalities (i.e., laparoscopic and open surgery), are at the core of a given hospital's demand for the da Vinci Surgical System. In economics, the term "derived demand" refers to demand "for an input that depends on, and is derived from, both the firm's level of output and the cost of inputs."[299] This concept is relevant to understanding the demand for the da Vinci Surgical System, which has its demand derived from the demand for surgeries.

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visualization or exposure of the things that I need to see is significantly better with the robotic approach than the laparoscopic approach.") *and* Francis (10/14/2022) Dep. Tr. 60:23-61:7 ("Q. You also, I believe, testified that you recommended that Franciscan invest in da Vinci surgical systems. Why did you recommend that investment? A. Because of the quality of the instrument and the tool we would be using, and the use of that tool would enhance the recovery of the patients, both in terms of less trauma and more efficient access and repair of certain aspects of the human body.").

[299] Pindyck and Rubinfeld at p. 530.

110. Professor Elhauge acknowledges that "[h]ospitals' consideration among potential alternatives […] could include downstream factors, such as surgeon demand, patient demand, etc."[300] However, he asserts the market must be defined at the level of the hospitals' purchasing decisions as hospitals, not surgeons or patients, "because hospitals are the actual customers."[301] This is, however, inconsistent with Intuitive testimony and documents that clearly also consider surgeons and patients to be its customers.[302]

111. That hospital demand for the da Vinci Surgical System is derived from surgeon (and implicitly patient) demand is reflected in surgeon testimony. For example, Mr. Early at Larkin Community Hospital noted that the hospital would not have acquired a da Vinci System unless they expected surgeons to use it.[303] At other hospitals, surgeons themselves repeatedly requested a da Vinci System until their requests were noted in formal and informal equipment acquisition processes and fulfilled.[304] The promise of a da Vinci System was also used in the hiring process to attract

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[300] Elhauge Report, ¶ 72.

[301] Elhauge Report, ¶ 72.

[302] Intuitive-00001237 at -250 and -251. Intuitive-00001788 at -793 which outlines Intuitive's quadruple aim of better outcomes, improved patient experience, lower costs, and improved care team experience. *See also*, Intuitive-00009824 ("U.S. Team Handbook") at -832 ("We seek to delight our customers: surgeons, surgical staff, and hospital administration, with extraordinary products and exceptional service and support.").

[303] Early (10/6/2022) Dep. Tr. 193:25-194:10 ("Q. Thinking back before the, Larkin purchased the Da Vinci Surgical Systems, did you tell Ms. Sosa-Guerrero that Larkin should not purchase those -- the robots? A. No, not that I can recall. Again, I, if the physicians were -- if the physicians were not going to use it, of course that would have been no. But the physicians were going to come. And I don't think anybody would have planned on acquiring that equipment if the expectation wasn't that physicians would use -- utilize that equipment.").

[304] Schimmel 30(b)(1) (9/22/2022) Dep. Tr. 25:23-26:16 ("Q. When did the Lafayette location of Franciscan start using da Vinci surgical systems for surgeries? A. 2009. Q. And why did Franciscan Lafayette first start using the da Vinci machines? …[A.] We had GYN physicians make the request. …Q. And why did they say they wanted the da Vinci surgical robots available for their use? …[A.] I don't remember. ….Q. Do you remember the names of the GYN surgeons who made that request? A. I do. Dr. McKweg, Dr. Wickert, Dr. Harrison were top three.")

Wagner (10/11/2022) Dep. Tr. 44:15-25 ("Q. And what was the nature of that discussion? A. The nature of that discussion primarily was with surgeons, they were under the -- under -- we had an understanding that the Si robot was nearing end of life, reported to us that it was one

surgeons to certain hospitals over others.[305] Testimony of Tyler McDonald, director of surgical services at Conway Regional Medical Center,[306] reflects the relationship between demand for the da Vinci robot and demand for a surgical procedure. In considering whether or not to upgrade from a da Vinci Si to a da Vinci Xi, McDonald acknowledged that the decision was influenced by the number of procedures they expected to perform with it.[307] He goes on to acknowledge that they compare the costs and benefits of robotic surgery with other surgical modalities.[308]

D. RELEVANT PRODUCT MARKETS SHOULD INCLUDE A PRODUCT'S CLOSEST COMPETITORS

112. Relative substitutability among products should drive the market definition analysis for Intuitive's surgical solutions. One standard way to construct a relevant antitrust market is to consider a product's substitutes in order of closeness.[309] Under this method, a proper starting

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of the oldest in the state, in fact, I seem to recall that they had shared with us -- they, meaning da Vinci, that it was one of the oldest on the West Coast, and there was a need and a desire from surgeons to want to use the Xi robot, and so we had ongoing discussions…").

[305] Estape (10/22/2022) Dep. Tr. 22:12-21 ("Q. …At some point, am I right, you had a relationship with Larkin Community Hospital? A. Yes. When I left Baptist Health, Larkin Hospital was almost literally across the street from one of the Baptist Health hospital at South Miami, and that's right were my office was at. And so I spoke with the director there and they were very willing to have me come over and buy two robots for me and for me to be able to do the cases there at Larkin Hospital.").

[306] McDonald (in *Restore*) Dep. Tr. 9:3-5 ("Q. What is your position at Conway Regional? A. My position is the director of surgical services.").

[307] McDonald (in *Restore*) Dep. Tr. 51:21-52:4 ("Q. What would be the types of factors that you would include in your forecast evaluating the benefits of using a da Vinci Xi? A. We would include the number of total cases that we would expect to use the robot, the types of cases that would be used, and the specific types of instruments that would be required for use, their costs, and the corresponding costs of the previous generation's model.").

[308] McDonald (in *Restore*) Dep. Tr. 52:16-25 ("Q. Other than the literature, have you done any internal analysis of costs that Conway has incurred itself when looking at benefits from robotic-assisted surgery? A. Yes. Q. And what have you done? A. We've reviewed our total costs, our length of stay expectations and history for these patients versus patients done with similar procedures absent the robot. That's primarily the mode of operation there.").

[309] In the economics of antitrust, this is the so-called "circle principle." That is, in building a relevant market around product A, if product C is included in a candidate market, and

point is to consider what are a hospital's or surgical center's other options, starting with the closest substitutes, when considering whether to purchase the da Vinci Surgical System.

113. Notably, Professor Elhauge agrees that the relevant question for market definition is whether other substitutes "compete closely enough with MIST surgery robots" to constrain Intuitive's pricing.[310] As I show below, evidence indicates that the closest substitutes to Intuitive's surgical solution are laparoscopic and open surgeries, both of which impose significant competitive constraints on the da Vinci Surgical System.

114. Since the introduction of the da Vinci Surgical System, Intuitive has been focused on its ability to compete for market access with other surgical modalities, especially open surgery and laparoscopy.[311] This effort starts with convincing a given hospital or surgical center that choosing to invest in the da Vinci Surgical System would be beneficial, given the alternative solutions, for the approved uses of the da Vinci Surgical System.[312] It is not surprising that comparisons to alternative forms of surgery, primarily laparoscopy and open, are a central focus of Intuitive's marketing efforts with customers about their prospective purchase of the da Vinci Surgical System. I will highlight here two dimensions that are evident from these efforts.

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product B is a closer substitute for product A than product C, then product B also should be included in the relevant market. *See* U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines" (HMG), at § 4.1.1, August 19, 2010, accessed January 4, 2023, available at https://www.justice.gov/atr/horizontal-merger-guidelines-08192010. Professor Elhauge agrees with this approach to market definition and the "circle principle." *See* Elhauge Report, ¶ 64 and fn. 156.

310 Elhauge Report, ¶ 73.

311 Intuitive 2000 Form 10-K at p. 2 ("Our products are designed to make a broad range of open surgical and MIS procedures suitable for Intuitive surgery. The da Vinci Surgical System is designed to allow surgeons to perform better surgery while providing patients with the benefits of MIS surgery. We believe that these advantages will enable us to drive a fundamental change in surgery.").

312 Intuitive 2000 Form 10-K at pp. 4-5. Intuitive advertises its advantages over alternative surgical solutions like open and laparoscopic surgery to hospitals and patients alike. *See also*, Intuitive-00000339 for an example of Sales Reference Materials for hospitals.

115. First, Intuitive compares the clinical efficacy of the da Vinci Surgical System against outcomes from laparoscopy and open surgery.[313] It does this by drawing from a large body of academic studies that make these comparisons using control groups of either laparoscopic surgery, open surgery, or both.[314] According to these studies, example benefits of the da Vinci Surgical System are a reduced frequency of surgical site infections and a shorter post-surgery hospital stay on average, when compared to laparoscopy and open surgery.[315] It is worth noting that, while several studies highlight the favorable clinical outcomes resulting from use of the da Vinci Surgical System, there are competing studies concluding that the efficacy of the da Vinci is not significantly better than that of laparoscopic and open solutions.[316]

116. Second, Intuitive compares the costs of the da Vinci Surgical System against those of using laparoscopy and open surgery, including after taking into consideration the savings resulting from the da Vinci's clinical benefits. A customer's decision to invest in a da Vinci Surgical System should consider its expected costs of operating the system over the system's lifetime when compared to alternatives.[317] Given the size of the customer's investment, Intuitive has pointed out to prospective customers that any expected cost savings attributable to da Vinci's benefits should be factored-in as well when making such comparisons. Intuitive has explained that if a patient undergoes a da Vinci procedure and requires one less day spent recovering in the hospital relative to the expected stay from undergoing the same procedure through use of another modality, the hospital's financial cost savings from that one less day of recovery time can be an

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[313] Intuitive-00065233.

[314] *See*, e.g., Dhanani et al. at pp. 1-2.

[315] *See*, e.g., Dhanani et al., Appendix Table 6.

[316] Dhanani et al. state (at p. 3): "We found slight decreases in both intraoperative and Clavien–Dindo complications with robot-assisted surgery, with increases in operative duration and cost; however, most studies failed to show significant benefit compared with current practices."

[317] For example, as discussed above, customers are made aware of the integrated aspect of the da Vinci Surgical System and the associated costs with operating it. See Section III.C above.

important factor when choosing which mode to use.[318] I understand that Intuitive refers to these marketing efforts as "Quantify the Impact" (QTI).[319]

117. Furthermore, Elhauge argues that "Manual laparoscopic instruments are not a meaningful substitute for EndoWrist instruments" because laparoscopic instruments cannot be attached to a da Vinci System for robotic surgery.[320] This is a red herring in the evaluation of Intuitive's competitive conduct, where the relevant question is whether the laparoscopic surgery is a substitute for robotic surgery as a solution, not whether the instruments are substitutes for each other.

118. Testimony from surgeons at the Named Plaintiffs' hospitals show da Vinci, laparoscopic, and open surgical techniques are used interchangeably for the same procedure, which not only is consistent with the view that laparoscopy and open surgery have been competitively constraining the da Vinci Surgical System,[321] but also runs contrary to Professor Elhauge's claim that "[o]nce surgeons have become proficient with robot-assisted surgery, they are often hesitant to go back to older methods."[322] For example:

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[318] Intuitive-00001237 at -263 ("[F]rom a cost standpoint, instruments and accessories are just the 'tip of the iceberg' as it relates to total cost to treat… This is an incomplete view unless you quantify the potential cost offsets associated with clinical measures such as LOS [Length of Stay], ICU admission, conversions [to costlier open surgeries], complications, surgical site infections, PACU [Post-Anesthesia Care Unit] time, readmission, and blood transfusions."). *See also* Intuitive-00001788 at -816, -818, -820, and -849.

Of course, through one less day in the hospital, the patient's experience is likely to be enhanced as well.

[319] Intuitive-00001788 provides an overview of the QTI process. Intuitive-00038260 is a specific example of a QTI presentation to Essentia St. Joseph's Hospital, incorporating the hospital's own data.

[320] Elhauge Report, ¶ 168.

[321] See Section IV above.

[322] Elhauge Report, ¶ 170.

- Dr. Estape, a gynecologic oncology surgeon at Larkin and director for HCA Florida's Institute for Gynecologic Oncology, stated that he makes the choice between open, laparoscopic, and robotic surgical modalities every day.[323]
- Similarly, Dr. Bernier, chief of surgery for the medical staff office at Valley Medical Center, acknowledged that there are no procedures for which she exclusively uses a single modality.[324]
- Dr. Maun, a colorectal surgeon at Franciscan, also stated that he alternates between surgical modalities for the same procedure.[325]

119. Further, Professor Elhauge argues that laparoscopic and open surgical methods are not economic substitutes for robotic assisted surgery and hence cannot constrain pricing for da Vinci robots.[326] Yet, evidence from surgeons and administrators at the Named Plaintiffs' hospitals indicates that cost is an important factor in the decision of surgical modality. For example, Larkin CEO Sandy Sosa-Guerrero stated that Larkin compared the price of performing procedures laparoscopically and robotically, and encouraged physicians to discuss the comparative costs with patients.[327]

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[323] Estape (10/22/2022) Dep. Tr. 7:24-25:3. Estape (10/22/2022) Dep. Tr. 19:7-10 ("Q. Are there times when you have an option to choose between open vaginal, lap or robotic surgery modalities? A. Every day.").

[324] Bernier (11/7/2022) Dep. Tr. 19:2-4 ("Q. Are there any surgeries that you perform exclusively using one modality and not the others? A. No."). *See also* Bernier (11/7/2022) Dep. Tr. 9:19-21 ("Q. What is your role at Valley? A. I am a colorectal surgeon at Valley, and I am the chief of surgery for the medical staff office.").

[325] Maun (11/8/2022) Dep. Tr. 16:5-8 ("Q. Do you perform open endoscopic and robotic-assisted surgeries in addition to laparoscopic surgeries? A. I do."); Maun (11/8/2022) Dep. Tr. 17:25-18:8 ("Q. Which of those three procedures do you perform using the Da Vinci system? A. The rectal cancer operations. Q. Do you also perform rectal cancer operations laparoscopically? A. I do. Q. Do you also perform rectal cancer operations using the open modality? A. I do."). *See also* Maun (11/8/2022) Dep. Tr. 12:9-11 ("Q. Would you describe for me, please, your medical training. A. I am a board certified colorectal surgeon."); Maun (11/8/2022) Dep. Tr. 12:19-22 ("Q. After completing your fellowship, where did you practice medicine? A. This has been my one and only job here at Franciscan.").

[326] Elhauge Report, ¶¶ 91-95.

[327] Sosa- Guerrero (9/23/2022) Dep. Tr. 182:8-183:8 ("Q. Well, let me ask you this: Did you come to a point of view while you were the CEO of -- at Larkin that there were some

Moreover, Dr. Estape stated that Larkin hospital administrators have asked him to switch to laparoscopic procedures for Medicaid or Medicare patients rather than using the da Vinci robot due to costs.[328] Dr. Burke, former chairman of the department of surgery at Valley Medical

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procedures that Larkin should do laparoscopically and there were other procedures that they should do robotically from a financial standpoint? …. [A.] I don't make those decisions that -- whether -- but when they would be coming to book them, we would say -- we would show the physician, this is what the insurance is going to cost, and the person, for -- for the most part, they had a high deductible in those cases, if they were robotics. High deductible. So I would say just tell the patient they have a $5,000 deductible and see where they go. And then, for the most part, they will go back to a doctor and ask questions, you know, what's the difference? And they would end up choosing, between the physician and the -- the patient, what they wanted to do…Q. In terms of whether it was going to be a robotic procedure or laparoscopic? A. (Witness nodding.) Q. You have to say 'yes' A. Yes."). *See also* Sosa-Guerrero (9/23/2022) Dep. Tr. 180:24-181:8 ("Q. Okay. In the discussion that you had with Mr. Gonzalez around the cost of robotic procedures, do you recall comparing the cost of robotic procedures to the cost of laparoscopic procedures? A. Yes. What I told him was I cannot make an assessment based on one case, you know. He needed to go back and do a spreadsheet with more cases, more insurance companies, providers, and then give me that, because this was just not going to sway me one way or the other.").

[328] Estape (10/22/2022) Dep. Tr. 21:1-16 ("Q. Have any of the hospitals that you've been associated with asked you not to perform a surgery in a particular way because of cost? A. Yes, sir. Q. What hospital or hospitals are you thinking of? A. Larkin is the only one. Q. And what did Larkin ask of you on that topic? A. Larkin at one point in time didn't want me to do any of the Medicaid patients or Medicare patients through the -- and this was right near the end when it came time for me to leave there. They were asking me not to do those cases because they didn't think they were making money on those patients."). *See also* Sosa-Guerrero (9/23/2022) Dep. Tr. 42:3-43:2 ("A. Because most of the patients that Dr. Estape had had both Medicare and Medicaid. When he first came, he told us he had more private insurance. We -- which pays at a higher rate. When he started doing the actual surgeries, the -- the patients that were coming through were mostly Medicare and Medicaid. Medicare nor Medicaid pay for robotic surgery. Q. Did Medicare and Medicaid pay for laparoscopic surgery? A. They paid a little bit more than the regular open surgery, but not substantially. …Q. And it sounds like Medicare and Medicaid pays a little more for laparoscopic or robotic surgery than for open surgery? A. Not for robotics. The robotics you get a flat rate of what the Medicare, Medicaid is. Q. And was that rate, from your recollection, the same as for a laparoscopic procedure? A. No. It was the same as the Medicare rate for open procedure.").

Center,[329] similarly recognized that the cost of the procedure influenced the choice of surgical modality and pointed to gall bladder surgery as one procedure that was generally performed laparoscopically due to the costs of the da Vinci instruments for the procedure.[330]

120. The competitive impact of other types of surgery on da Vinci Surgical Systems is also reflected in data covering surgical procedures considered by Intuitive, where the company tracks its presence by comparing itself against laparoscopic and open surgeries using data under subscription from IQVIA.[331] Figure 1 below shows the rise of da Vinci surgery within the United States over 2012-2021 using procedure volume data from IQVIA covering the specific categories of surgeries where da Vinci is cleared for use.[332] As depicted in the figure, da Vinci's rise over

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[329] Burke (9/27/2022) Dep. Tr. 15:5-10 ("Q. Dr. Burke, when did you first join Valley Medical? A. August of 1984. Q. And at some point, you became the chairman of the department of surgery; correct? A. A couple of times, actually, yeah.").

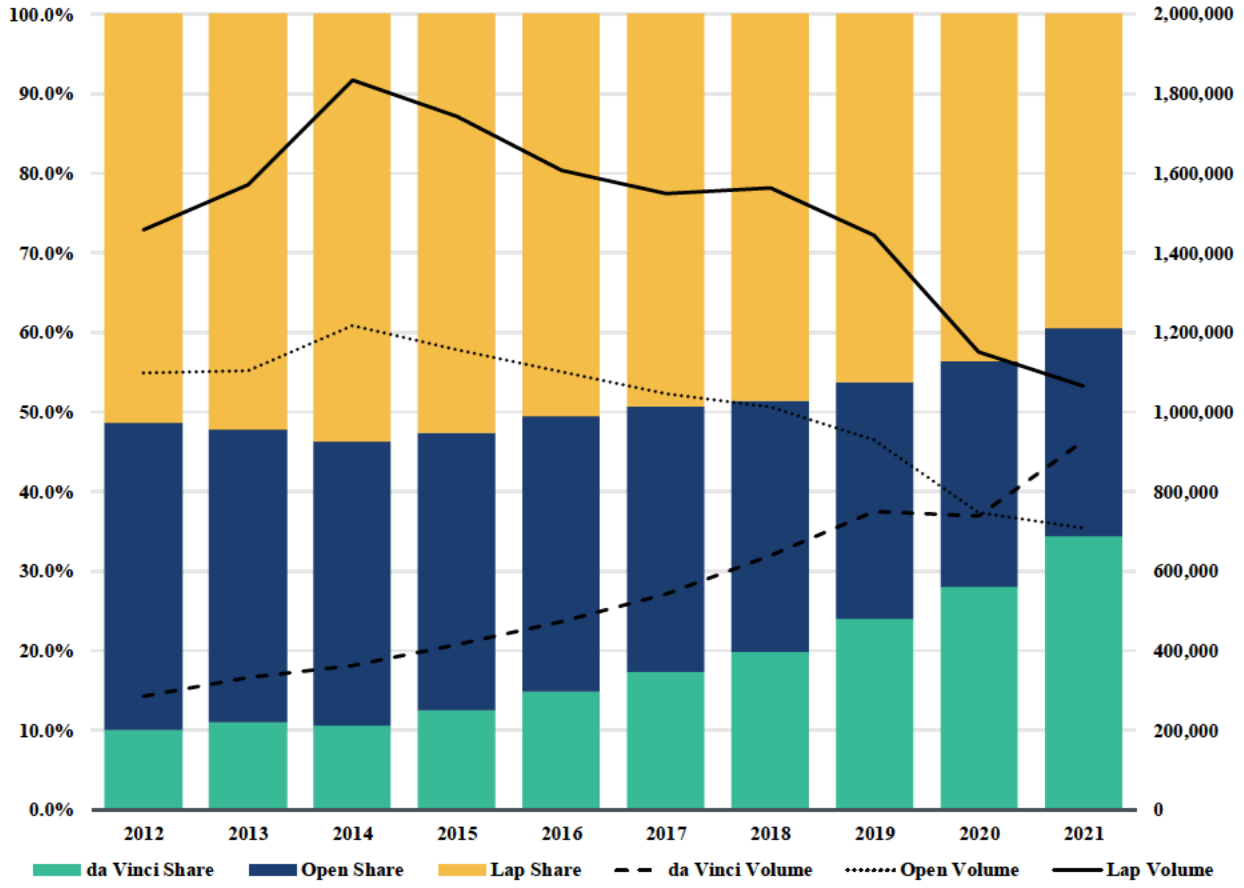
[330] Burke (9/27/2022) Dep. Tr. 25:9-25 ("Q. Was cost ever a factor in determining which modality you would use? …[A.] Yes, I mean, that's why most of the gallbladder surgery was done laparoscopically versus robotically. Couldn't get the cost down. … Q. What do you mean by you 'couldn't get the cost down'? A. Well, the instruments on the Da Vinci were more expensive. The equipment that we used to perform a standard gallbladder operation were more expensive. And so the laparoscopic equipment, when analyzed by our hospital, was less expensive, and so that came into play. Plus we needed a higher level of technology."). *See also* Burke (9/27/2022) Dep. Tr. 26:1-24 ("Q. Who at the hospital performed the analysis to determine that the -- that the cost couldn't be brought down, I think you said? A. Well, we have an OR manager that looks at the data on -- almost on a monthly basis, and used procedures, whether it's gallbladder or colon or more advanced procedures. Q. So they would look at this on a per-procedure basis? A. Yes. Q. So some procedures you would decide to -- the hospital would decide to perform laparoscopically, but other procedures it may not? A. Well, the hospital didn't -- doesn't really make that decision, but at least they were trying to give us data to help us decide the appropriateness of the procedure. Q. And that data would vary by procedure-type? A. Yes, and by surgeon. Q. Why would it vary by surgeon? A. Well, some surgeons would use more expensive equipment, either open laparoscopically or even robotically, to get a procedure performed.").

[331] IQVIA is a leading vendor of healthcare data that estimates hospital-level procedures. *See* "About Us," IQVIA, accessed January 16, 2023, https://www.iqvia.com/about-us. *See also* "Real World Data Sets," IQVIA, accessed January 6, 2023, https://www.iqvia.com/solutions/real-world-evidence/real-world-data-and-insights. *See also* Intuitive-00014989 at -993 to -996

[332] I see no reason to disagree with Professor Elhauge's assessment that the United States should be the relevant focus for assessing the alleged conduct.

this period coincided with a reduction in the portion of surgeries performed either laparoscopically or through open surgery.

FIGURE 1
DA VINCI SHARE OF MINIMALLY INVASIVE AND OPEN SURGERIES FOR DA VINCI SURGICAL CATEGORIES



Sources and Notes:

- Based on IQVIA data. The above figure is limited to the da Vinci procedural categories tracked by IQVIA. For making comparisons over time, the figure limits hospitals to those present in each year of the data from 2012 to 2021.
- See Appendix A for discussion of the data preparation.

121. The apparent substitution to the da Vinci Surgical System from laparoscopy and open modalities, and in some cases, vice versa, is also evident from looking over time at the specific hospital level. I examined the relative shares of these three modalities over a ten-year period 2012-2021 for hospitals that used the da Vinci Surgical System as of 2021, including hospitals that were

new to using it during the period. The details, which are presented in Appendix A, Table A-3[333] can be summarized as follows:

a. Among the 96 percent of hospitals that had an *increase* in da Vinci's share of procedures, including new da Vinci customers, the average increase in share was 37 percentage points, of which 19 percentage points came from laparoscopy and 18 percentage points came from open surgery.

b. Among the 4 percent of hospitals that had a *decrease* in da Vinci's share of procedures, the average percentage point decrease in share was 11.5 percentage points, while laparoscopy increased by 12.5 percentage points and the share of open surgery decreased by 1 percentage point, on average.

c. Approximately 0.4 percent of hospitals had neither an increase nor decrease in da Vinci's share.

122. The presence of laparoscopy and open surgery is also evident when looking within procedure category. Table 1 below shows the proportion of procedures performed with the da Vinci Surgical System, laparoscopy, and open surgery. As indicated in the table, there is a significant presence of laparoscopic and open surgery within each surgical category where the da Vinci Surgical System is used to perform surgeries. These figures provide insight into Intuitive's competitive landscape from the perspective of the demand for its da Vinci Surgical System among both its customers and potential customers.

[333] Appendix A also shows the same calculations by IDN—relevant data patterns are similar.

TABLE 1
AVERAGE MODALITY SHARE OF PROCEDURE CATEGORY, 2021

Category & Procedure Type	# of Hospitals Performing Procedure	% of These Hospitals Using da Vinci	da Vinci Share	Laparoscopic Share	Open Share
	[A]	[B]	[C]	[D]	[E]
Colorectal					
Colon	3,603	49%	23%	15%	62%
Rectal	1,733	59%	36%	12%	52%
General Surgery					
Bariatric	2,701	33%	16%	52%	32%
Cholecystectomy	4,209	42%	14%	80%	6%
Hernia	4,262	47%	23%	18%	58%
HPB	1,119	37%	18%	12%	70%
Foregut	2,784	53%	25%	73%	2%
Gynecology					
Hysterectomy	3,622	50%	33%	45%	22%
Thoracic	2,074	36%	19%	43%	38%
Urology					
Nephrectomy	2,215	62%	37%	33%	31%
Prostatectomy	2,055	70%	61%	29%	10%

Sources and Notes: Based on IQVIA data for 2021. "Cardiac" and "Head and Neck" are omitted because these categories are not tracked in the IQVIA data and account for less than 1 percent of all da Vinci procedures in 2021 based on Intuitive-00706097. "HPB" stands for Hepato-Pancreato-Biliary surgery, which involves surgery of the liver, pancreas and biliary system.

– [A]: 4,452 total hospitals in the IQVIA dataset performed at least one surgery in 2021.
– See Appendix A for discussion of data preparation.

123. The presence of laparoscopic and open surgery within the da Vinci's procedure categories is also evident when looking specifically at those hospitals that utilized the da Vinci Surgical System during 2021 (i.e., Intuitive's "customers"). As shown in Table 2 below, Intuitive's customers also are performing sizeable surgical volumes using these other modalities and, over time, the presence of other surgical modalities constrains any market power Intuitive may have. In addition, as I discuss in Section V below, these competitive constraints are also evident in Intuitive's pricing.

TABLE 2
AVERAGE MODALITY SHARE OF PROCEDURE CATEGORY AT DA VINCI HOSPITALS ONLY, 2021

Category & Procedure Type	# of Hospitals Performing Procedure	da Vinci Share	Laparoscopic Share	Open Share
	[A]	[B]	[C]	[D]
Colorectal				
Colon	2,015	41%	9%	51%
Rectal	1,380	45%	8%	47%
General Surgery				
Bariatric	1,813	23%	48%	28%
Cholecystectomy	2,054	29%	65%	6%
Hernia	2,066	48%	11%	41%
HPB	937	22%	11%	67%
Foregut	1,859	37%	61%	2%
Gynecology				
Hysterectomy	2,000	59%	27%	14%
Thoracic	1,566	25%	39%	36%
Urology				
Nephrectomy	1,698	48%	26%	26%
Prostatectomy	1,640	76%	18%	6%

Sources and Notes: Based on IQVIA data for 2021. "HPB" stands for Hepato-Pancreato-Biliary surgery, which involves surgery of the liver, pancreas and biliary system.

– [A]: 2,076 total hospitals in the IQVIA dataset performed at least one da Vinci surgery in 2021.
– See Appendix A for discussion of data preparation.

124. The fact that laparoscopic and open surgeries competitively constrain Intuitive's pricing is illustrated in particular among benign and low acuity surgeries, such as cholecystectomies. An internal Intuitive document shows that I&A revenue per procedure is lower for procedure types with lower hospital reimbursements, where laparoscopic and open surgeries may be more attractive options for hospitals.[334] To more effectively compete, Intuitive introduced extended use Xi EndoWrist instruments aimed at reducing the costs of instruments per procedure and

[334] Intuitive-00014989 ("Procedure Prioritization") at -997.

making robotic surgery even more attractive to hospitals using all three surgical modalities.[335] In addition to the Extended Use programs, Intuitive lowered the price of certain instruments that are most commonly used in lower acuity procedures and/or lower reimbursed procedures.[336]

125. Contrary to the evidence above, Professor Elhauge asserts that "Intuitive [d]oes [n]ot [t]reat [t]raditional [p]rocedures as a [c]ompetitive [t]hreat."[337] He cites to a few Intuitive documents to support this conclusion, but frequently mischaracterizes or overlooks the evidence in the record. For instance, Professor Elhauge points to Intuitive's *forward-looking* analysis of the competitive landscape and *future entrants* as evidence that Intuitive only views other surgical robots as competitors and not traditional surgical devices (which were already competing in the market and naturally would not be considered as potential entrants).[338] In the same analysis, Intuitive

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[335] Intuitive-00687060 at -063 ("Reducing the price-per-use for da Vinci X/Xi instruments commonly used in these procedures makes the benefits of da Vinci surgery more achievable, at a cost more in line with the cost of laparoscopic procedures.").

Tourand (11/4/2022) Dep. Tr. 134:1-23 ("Q. Do I understand that if the lives were increased by 50 percent from 10 to 15 and the price of the instrument were increased by some percentage less than 50 percent, that the customer would receive some portion of the savings but not 100 percent of the savings?... [A.] That is correct. It's a complex -- it's more -- more complex than it needs to be in that example. If you don't change the price of the existing instrument at 10 uses, but you increase the number of uses, then the price per use goes down. The customer then receives 100 percent of the benefit. On the other -- on the other side, if you increase the uses and you keep the price per use the same, the instrument list price increases, and Intuitive receives all the benefit. So the program was designed to reduce the price per use of the da Vinci X and XI instrument and share in that Extended Lives Program benefit with the customer.").

[336] Intuitive 2021 Form 10-K at pp. 58-59. These reduced pricing instruments include medium/large clip applier, permanent cautery hook, permanent cautery spatula, and round tip scissors. *See*, e.g., Intuitive-00560028 at -038. Intuitive-00840257 at -069 ("Objective: Leverage the economic benefit of Extended life instruments to lower the barrier to adoption with a focus on targeted cost sensitive procedures.") and -278 ("Intuitive's product offering is increasingly aligned with economic realities of my hospital, and allowing me to offer da Vinci as a first choice to a broader set of patients than before…Standardize instruments used in targeted procedures: benign surgery in U.S., malignant surgery in EU to bring per procedure costs closer to lap.").

[337] Elhauge Report, ¶¶ 97-101.

[338] Elhauge Report, ¶ 97. DeSantis (in *Rebotix*) Dep. Ex. 6 at -293, -299, -320, -367.

compares the cost per procedure of two robotic surgical solutions (Avatera and Medtronic) with the cost per procedure for laparoscopic surgery.[339] Similarly, in another document Professor Elhauge relied on in an effort to show that Intuitive set da Vinci platform prices based on competing robots instead of traditional surgical devices, there are actually multiple price comparisons with laparoscopic procedures.[340] Further, in the notes Intuitive prepared for panel discussion that Professor Elhauge quotes to support the position that Intuitive "does not treat traditional procedures as a competitive threat,"[341] Intuitive states that "[it has] had competitors from the beginning" and that it considers "the full global surgical market opportunity to provide minimally invasive surgery" as competition.[342]

126. Professor Elhauge also highlights the price differences between da Vinci robots and laparoscopic towers to suggest that the two are not close substitutes.[343] This again is a red herring. Intuitive's pricing for its robotic platform may or may not be significantly impacted by the price of laparoscopic towers. Price levels can significantly differ among competitors in differentiated product markets.[344] But, in any event, a comparison of prices for laparoscopic towers and the da Vinci robotic platform is not what is important to the evaluation of Intuitive's competitive conduct. As I have shown above, Intuitive and the da Vinci Surgical System significantly compete with laparoscopy and open surgery. Hence, Intuitive always has been focused on the competition with other surgical solutions through the value it can provide to patients, which is especially clear in Intuitive's QTI materials.[345]

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[339] DeSantis (in *Rebotix*) Dep. Ex. 6 at -384.

[340] Intuitive-00820368, at -375, -376, -410.

[341] Elhauge Report, ¶ 97.

[342] Vavoso (in *Rebotix*) Dep. Ex. 9 at -125.

[343] Elhauge Report, ¶¶ 101, 107.

[344] *See*, e.g., Jeffrey M. Perloff, *Microeconomics, Seventh Edition* (Boston: Pearson Education, Inc., 2015), 444-446.

[345] Intuitive-00003233 at -245. *See also* Intuitive-00916726 at -737, -739, and -742 to -755. *See also* Intuitive-00918259 at -263 and -266 through -270.

127. The testimony cited by Professor Elhauge that TransEnterix's CEO considers laparoscopic surgery to be "totally different" from robotic surgery is not evidence that laparoscopic surgery and open surgery are not principal competitive constraints for Intuitive.[346] It would not be surprising for the manufacturer of a follow-on product, TransEnterix, to consider the innovator product, the da Vinci Surgical System, to be a competitive focus, but, at the same time, for Intuitive to consider TransEnterix's surgical system to be a less important competitive constraint than laparoscopic and open surgery, particularly given TransEnterix's modest commercial success. Moreover, in spite of Mr. Pope's testimony that laparoscopic surgery is "totally different" than surgeries provided by TransEnterix's system,[347] testimony nearby in the same deposition indicates that being a close substitute for laparoscopic surgery is a primary competitive consideration for TransEnterix.[348]

128. Professor Elhauge claims that even if the da Vinci platform, instruments, and servicing were to be considered a single product, competitive pricing for reset instruments or servicing still would be a competitive constraint on the single product.[349] Although it is plausible that there could be unintegrated third parties that could competitively constrain Intuitive's pricing, as explained

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[346] Elhauge Report, ¶ 99.

[347] Pope (in *Restore*) Dep. Tr. 81:6-8 ("A. You know, laparoscopic surgery is one thing. Robotic surgery is a – a totally different.").

[348] Pope (in *Restore*) Dep. Tr. 76:15-77:18 ("Q. Okay. Why would – why was Senhance uniquely positioned, in your judgement as – as the CEO – and president, to address the laparoscopic market. A. The – it's a couple things. The controllers of the Senhance operate similar to laparoscopy. When you rotate your hand up, the tip of the instrument goes down, and that's similar to laparoscopy. It was easier to set up than Intuitive. So the rapid docking was closer to setup time for laparoscopy. In robotics, under Intuitive it's very hard to reposition the patient because all the arms come from one boom and it's very crowded in the sterile field. But you see that picture there, our arms are all separate and it can be moved away and we have a boom arm that can be far away from the patient and keep the sterile field uncluttered, which is different than Intuitive. We use 5-millimeter instruments in our robotic offering, and that's what the majority of the laparoscopic market uses. Intuitive used more like 8-millimeter instruments, so they made a larger hole. And with our device, you could feel when you come in contact with tissue or bone. That's called haptic feedback. That's what they were able to have in laparoscopic surgery. And Intuitive did not offer that. Those are the main reasons."). *See also*, e.g., Pope (in *Restore*) Dep. Ex. 6 at -153.

[349] Elhauge Report, ¶¶ 193, 240.

above, evidence indicates that Intuitive's most significant competitive constraints are other surgical solutions.

129. The above evidence supports a surgical solutions marketplace in which the da Vinci Surgical System is one among other competitive options for hospitals and where Intuitive is particularly focused on competition with its closest substitutes—laparoscopic and open surgeries—consistent with Intuitive not being positioned to exercise monopoly power.

E. PROFESSOR ELHAUGE MISINTERPRETS AND MISAPPLIES PRINCIPLES OF MARKET DEFINITION

130. The "hypothetical monopolist" or "SSNIP" test for market definition is a concept that typically is applied in the evaluation of horizontal mergers. It is well understood by economists that the SSNIP test, although useful as an organizing concept for market definition, generally is not as straightforward to apply in monopolization cases.[350] This is because, if, for example, Intuitive possesses monopoly power, it already should be pricing as a monopolist would, and thus could not profitably impose a SSNIP on its customers regardless of what company it merges with.

131. The Horizontal Merger Guidelines acknowledge that significant substitution at current prices may not justify broadening the market definition if current prices are already above the competitive levels.[351] Citing to the Guidelines, Professor Elhauge argues that the relevant market definition inquiry should be whether Intuitive could impose a small but significant non-transitory increase in price ("SSNIP") on the price that would prevail under unrestrained competition, instead of current prices that he claims have already been "anticompetitively inflated."[352] As a matter of economics, I generally agree with Professor Elhauge's logic. However, this well-

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[350] *See*, e.g., Lawrence J. White, "Market Power and Market Definition in Monopolization Cases: A Paradigm Is Missing," in Wayne D. Collins, ed., *Issues in Competition Law and Policy*, American Bar Association, 2008.

[351] Elhauge Report, ¶ 70.

[352] Elhauge Report, ¶¶ 70-71.

known "cellophane" fallacy[353] does not apply to Intuitive's pricing because, as I explained above, Intuitive significantly has been competing with alternative surgical solutions, especially laparoscopy and open surgery.

132. I did not find a SSNIP test in Professor Elhauge's report, and the evidence he presents to support his claim that Intuitive is not constrained by alternatives such as laparoscopy and open surgery is inapposite. Professor Elhauge quotes two hospital executives who claim that Intuitive could increase prices without losing their business.[354] Hospitals asserting that they would not respond to a price increase indicates that they are what economists call inframarginal customers—i.e., they are not the customers that currently are constraining Intuitive's ability to increase prices. Hence, they are immaterial to Intuitive's competitive pricing decisions and provide no useful information in the assessment of the relevant markets where Intuitive competes. If anything, hospital claims that Intuitive could increase prices but did not do so indicate that Intuitive *is not* behaving like a monopolist.

133. Professor Elhauge incorrectly asserts that asymmetric switching over time from traditional surgical modalities—laparoscopic surgery and open surgery—to surgeries that rely on the da Vinci Surgical System indicates that traditional surgical modalities and da Vinci surgeries are in separate relevant product markets.[355] From an economic perspective, asymmetric switching between brands is a well-documented phenomenon for products with perceived differences in

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[353] *See e.g.*, Gregory Werden, "The History of Antitrust Market Delineation," *Marquette Law Review* 76, No. 1 (1992): 123-215. In discussing the well-established economic critique known as "cellophane fallacy" regarding the Supreme Court's error in evaluating "the cross-elasticity of demand at the monopoly price" during the *Cellophane* case, the article states: "A rational monopolist raises price until competition from other products makes further increases unprofitable. At that point, there are likely to be significant cross-elasticities of demand with other products, but they are entirely irrelevant to the question of whether the firm possesses market power. The relevant question for assessing the firm's market power is whether the cross-elasticities of demand were so great near competitive price levels as to prevent a significant elevation of prices above the competitive level in the first instance" (p. 139).

[354] Elhauge Report, ¶¶ 77, 106.

[355] Elhauge Report, ¶¶ 91-94.

quality.[356] This does not negate the possibility that quality-differentiated brands are in the same product market. What matters is whether there is sufficient ongoing competition for marginal consumers between products, which may or may not be consistent with observed trends in product switching.

134. In this case, Intuitive's significant ongoing investments in the da Vinci Surgical System has improved surgical efficiency and clinical outcomes.[357] As a result, because prices related to the da Vinci Surgical System have remained flat or fallen,[358] the quality-adjusted price of the system has fallen. The migration to Intuitive's surgical system from traditional surgical modalities, therefore, is consistent with hospitals substituting away from open and laparoscopic surgery in response to a reduction in Intuitive's quality-adjusted price. Moreover, this reduction in quality-adjusted price stemmed from Intuitive's significant ongoing investments, which would be wholly unnecessary if Intuitive was not engaged in significant competition with laparoscopic and open surgery.

F. PROFESSOR ELHAUGE'S MARKET SHARE CALCULATIONS ARE INAPT

135. Professor Elhauge points to Intuitive's "high" market shares in (1) the market for MIST surgery robots, (2) the market for EndoWrist repair and replacement, and (3) the market for da Vinci servicing as evidence of Intuitive's alleged monopoly power.[359] However, his flawed market definition renders his market share calculations inapt and uninformative.

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[356] Greg M. Allenby and Peter E. Rossi, "Quality Perceptions and Asymmetric Switching between Brands", *Marketing Science* 10, No. 3 (1991):185 ("Asymmetric switching between high quality and low quality brands is well documented. Price reductions in higher quality brands attract more consumers than do price reduction in lower quality brands. This behavior has been documented with store level data by Blattberg and Wisniewski (1989) and by Kamakura and Russell (1989) with scanner panel data.").

[357] *See* Section II.C above.

[358] *See* Sections V.A-C below.

[359] Elhauge Report, ¶¶ 112, 179, 229.

136. The Horizontal Merger Guidelines instructs that "the purpose of defining the market and measuring market shares is to illuminate the evaluation of competitive effects."[360] As I explained in Section IV.D, the relevant market to evaluate Intuitive's competitive conduct should be built around Intuitive's surgical solution and include its closest substitutes, which have been laparoscopy and open surgery. Hence, Professor Elhauge's market shares should account for the competitive constraints imposed by laparoscopic and open surgery, which they do not.

V. INTUITIVE'S PRICING AND MARGINS IN PLAINTIFFS' ASSERTED "FORE" AND "AFTER" MARKETS DO NOT REFLECT THE ABUSE OF MONOPOLY POWER

137. Professor Elhauge's analysis of Intuitive's alleged monopoly power involves a tautological assertion that Intuitive has monopolized a market for a product that effectively only it sells. In support of this claim, he concludes that Intuitive has priced the components of the da Vinci Surgical System (systems, EndoWrists and accessories, and servicing) at "supracompetitive" levels[361] and that Intuitive's "contribution" margins exceeded "reasonably competitive levels" between 2017 and 2020.[362] As I discuss below, the specific margin measures he examines are not only irrelevant to an inquiry about the exercise of monopoly power, these measures omit the costs of Intuitive's numerous and ongoing investments, which are fundamental to consider and that Professor Elhauge discusses in his report as being important to Intuitive's success.

138. Moreover, his conclusions here are inapposite because Intuitive must earn positive margins to support its procompetitive and pro-consumer innovations, which Professor Elhauge

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[360] *See* HMG § 4.1.1.

[361] Professor Elhauge alleges that Intuitive's prices are "anticompetitively" elevated for its systems (Elhauge Report, ¶ 129-131), prices for EndoWrists (Elhauge Report ¶¶, 188-189), and for system servicing (Elhauge Report, ¶¶ 234-236).

[362] Professor Elhauge argues that Intuitive's contribution margins are higher than what could exist in a reasonably competitive market for its systems (Elhauge Report, ¶ 130), Endowrists (Elhauge Report, ¶¶ 188), and system servicing (Elhauge Report, ¶¶ 235).

acknowledges have been significant and costly.[363] For example, in explaining why developing a surgical robot "is time consuming and expensive"[364] Professor Elhauge states: "…[t]he importance of these costs is magnified by the fact that the costs are incurred up front and potential entrants must raise money for these costs based on the promise of long-term payoffs."[365]

139. In addition, as a matter of economics, it would have been illogical for Intuitive—when it first began marketing da Vinci Surgical Systems—to charge supracompetitive prices and impose anticompetitive tying arrangements as it initially fought to gain a toe-hold in the broader market for surgical solutions against well-established alternatives such as traditional open and laparoscopic surgeries. That is, surely Intuitive did not act as a monopolist before it gained *any* significant sales.

140. Based on this economic logic, one way to evaluate whether Intuitive has been imposing supracompetitive prices and anticompetitive contract terms is to determine the extent to which Intuitive has changed its competitive behavior as it has grown. As I noted above, Intuitive always has competed by selling the components of its surgical system together. Moreover, the analyses presented in this section, as further described below, show that (i) Intuitive's platform prices have not increased; (ii) prices for instruments have not increased; (iii) Intuitive's service prices have not increased; and (iv) there is no evidence of price discrimination across customers. Hence, Intuitive's pricing behavior has not reflected an exercise of monopoly power.

A. INTUITIVE'S PLATFORM PRICES HAVE NOT BEEN INCREASING OVER TIME

141. In Figure 2 below, I show average selling prices for the da Vinci model Xi over the period 2014 to 2021 among U.S. customers who purchased the platform. This model accounted for 93 percent

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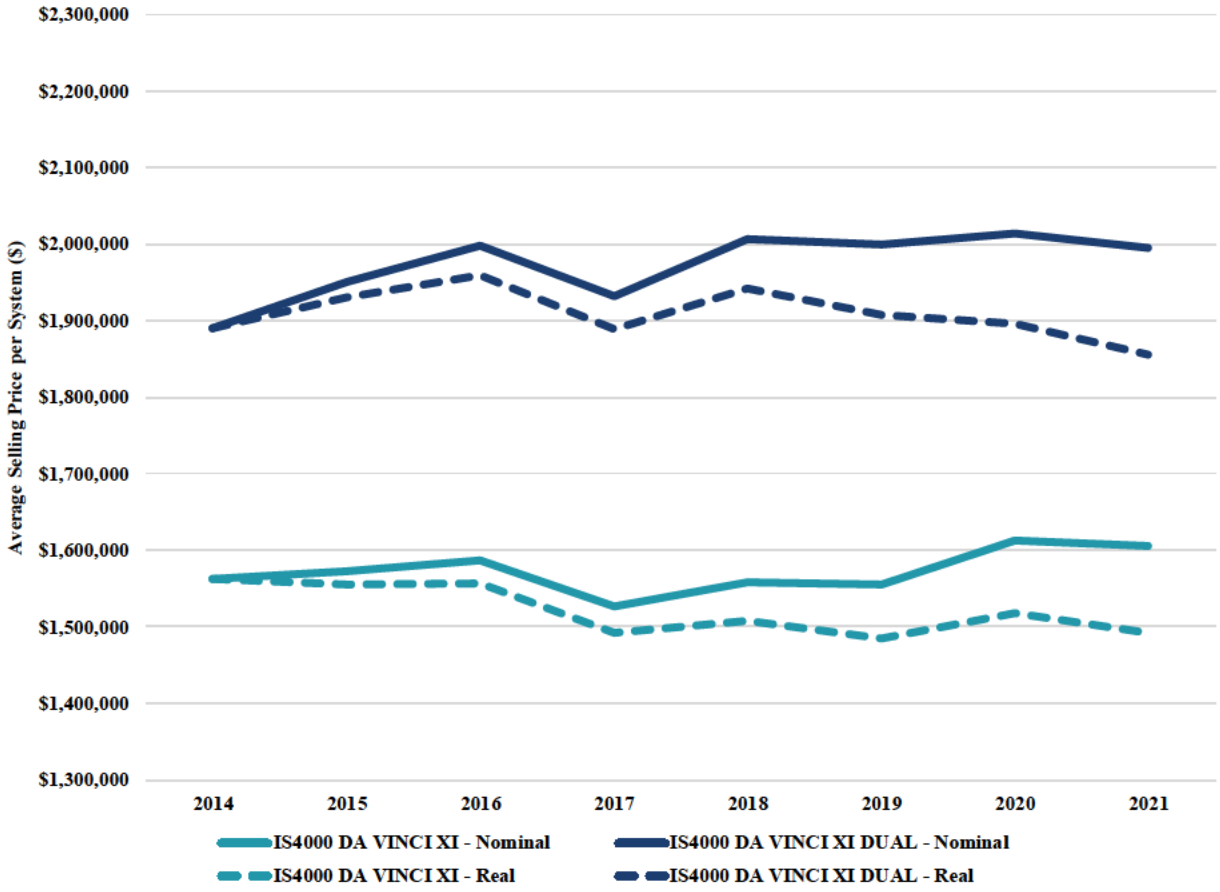
[363] Professor Elhauge notes that barriers to entry are high because costs for developing a surgical robot are high and incurred upfront (Elhauge Report, ¶¶ 115-116).

[364] Elhauge Report, ¶ 115.

[365] Elhauge Report, ¶ 116.

of the sales revenue from platform purchases during the period, and it was the only model that was sold in every year of this period.[366] As shown in the figure, da Vinci platform prices for both Dual and Single console Xi models were relatively flat during this period—increasing slightly on a nominal basis and decreasing slightly in real terms.

FIGURE 2
AVERAGE SELLING PRICES FOR THE DA VINCI MODEL XI, SINGLE AND DUAL CONSOLE, 2014-2021



Sources and Notes: Based on Intuitive's System Sales data. Current dollars are converted to constant 2014 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). See Appendix A for discussion of data preparation.

366 *See* System Price Workpaper.

142. Evidence also indicates that Intuitive lowered its list prices for the da Vinci model Si during the period above. For example, Intuitive lowered its 2017 U.S. list prices for each of its five specific Si platform models.[367] These reductions ranged between 20 and 28 percent relative to 2016 prices, depending on the specific model.

B. INTUITIVE'S INSTRUMENT PRICES HAVE NOT BEEN INCREASING OVER TIME

143. As an initial observation, Intuitive's instrument pricing does not appear to differ within the same period for customers who have purchased the same instrument (as defined by the "product" number).[368] For example, when looking across all of Intuitive's instruments sold during 2021, on average, 96 percent of customers paid the same price for the specific instrument.[369] Although the mixture of instruments purchased can and does typically vary between customers due to the specific instrument needs of their surgeries, prices for particular instruments generally show limited variation across customers during a given year.[370] Hence, to account for the possibility that Intuitive increased prices in a discriminatory way by raising the prices of frequently used instruments or on instruments used in high-volume procedures, I examine pricing using alternative lenses. For my initial assessment, I evaluate instrument prices on a "per-procedure" basis after combining the detailed procedures data together with Intuitive's "net sale" amounts from instrument sales transactions for the customer over a particular year.[371]

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[367] Intuitive-00002937 at -940. This slide compares approved U.S. list price changes by model between the two years.

[368] The specific field in Intuitive's Instrument and Accessories data is called "product," which is a six-digit product number typically along with a two-digit suffix. For a discussion of the data preparation involved in this analysis, see Appendix A.

[369] *See* Price Per Procedure Workpaper.

[370] When looking across years, the composition of particular instruments sold might change over time due to changes in the prevalence of "single-use" instruments or due to changes in the frequency of sales for particular instruments after Intuitive's recent Extended Use Program.

[371] *See* discussion under Data Preparation in Appendix A.

144. Professor Elhauge highlights that EndoWrist prices can and have changed over time to support his claim that EndoWrists are sold in a distinct market from the other components of the da Vinci Surgical System.[372] I explain above why I disagree with Professor Elhauge's conclusion.[373] Moreover, what Professor Elhauge fails to explain, and what I show below, is that any changes in EndoWrist prices over time generally have resulted in an overall EndoWrist price trend that is generally flat, depending on how prices are considered. This is inconsistent with Professor Elhauge's conclusions that the challenged conduct has allowed Intuitive to exclude third parties and maintain a near-100-percent monopoly in a putative market for EndoWrist repair and replacement for nearly 20 years.[374]

145. Figure 3 shows this comparison of instrument prices over time using the metric of price per procedure. Here each line shows the trend in median price paid among customers during the calendar year, and I show these prices both with and without adjusting for inflation (separate lines are shown for "real" versus "nominal"). Both lines in the chart indicate that prices have not risen over time. Neither trend is indicative of an exercise of monopoly power.

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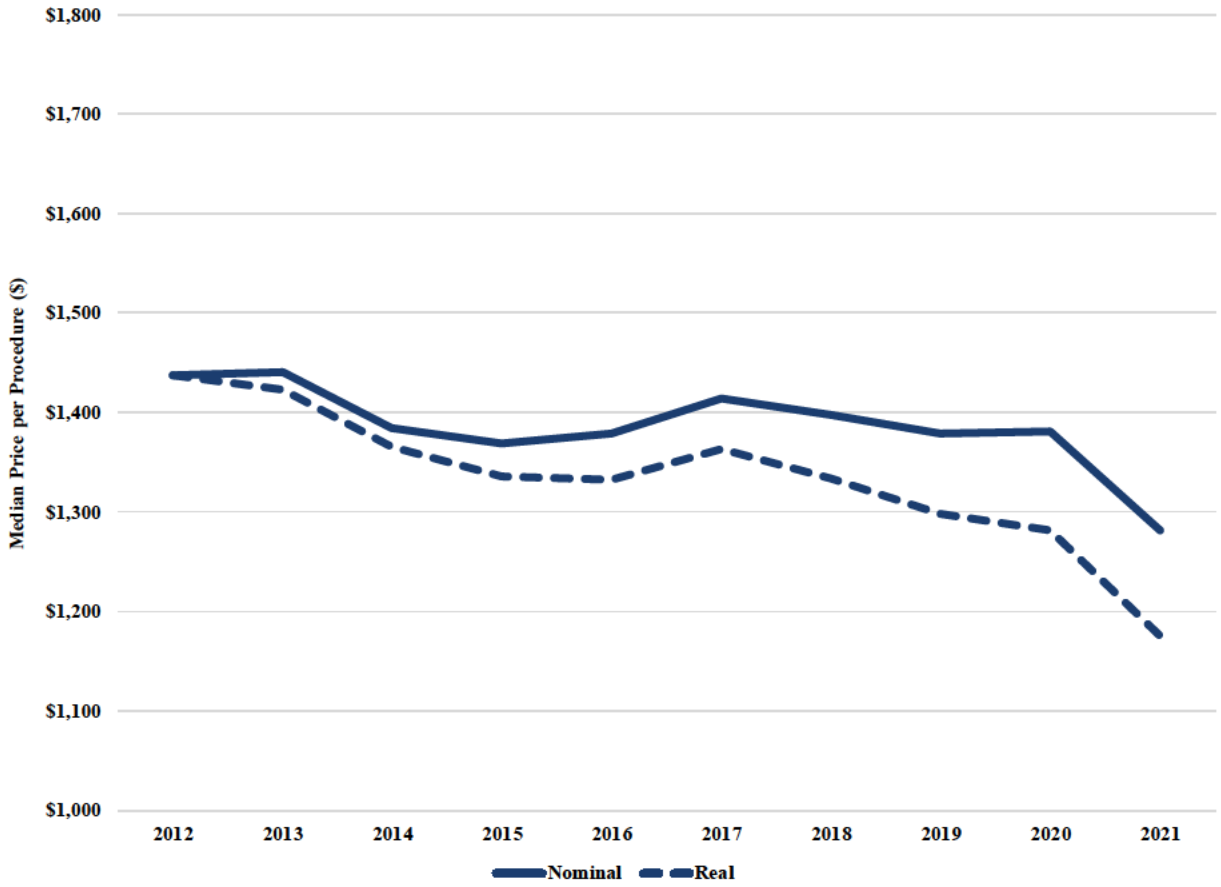
[372] Elhauge Report, ¶ 146.

[373] *See* Section III above.

[374] Elhauge Report, ¶¶ 179, 190.

FIGURE 3
MEDIAN ANNUAL DA VINCI INSTRUMENT PRICES FOR U.S. CUSTOMERS, EXPRESSED PER PROCEDURE



Sources and Notes: Prices per procedure relate net sales amounts calculated from Intuitive's I&A sales data to Intuitive's procedures data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391).

See Appendix A for discussion of data preparation.

146. These findings are also confirmed when I examine the price of instruments over time when measured on a per-use basis.[375] For this assessment, I measure prices by relating Intuitive's "net sale" amounts from instrument sales to its recorded number of uses for each instrument.[376]

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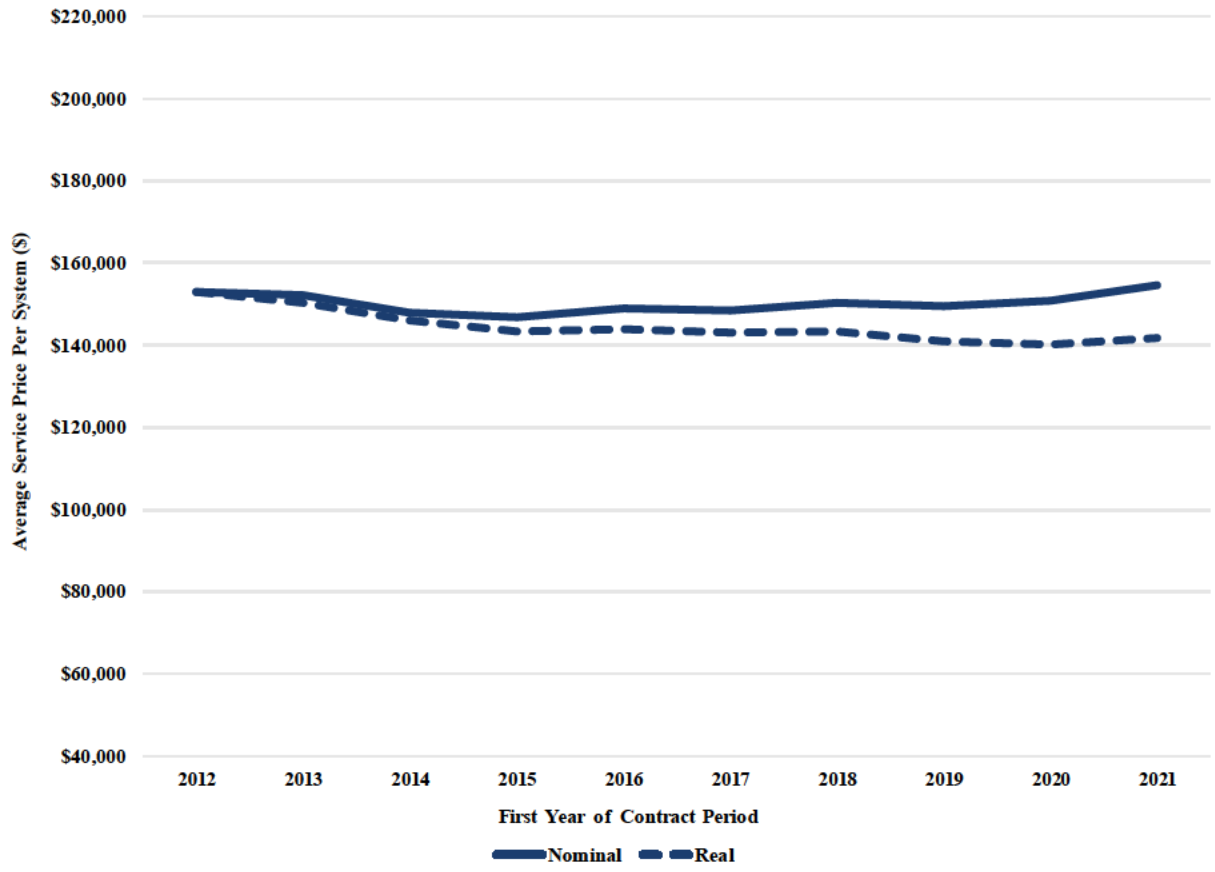
[375] *See* Figure A-3 in Appendix A. I use a regression analysis to control for changes in the composition of individual instruments sold across customers in a given year, and the results of the analysis confirm that prices have not risen over time. *See* Table A-1 in Appendix A. I also include a regression analysis where I look only at prices for instruments sold for the S/Si models. *See* Table A-2 in Appendix A.

[376] *See* discussion under Data Preparation in Appendix A.

C. INTUITIVE'S SERVICE PRICES HAVE NOT BEEN INCREASING OVER TIME

147. In this section, I evaluate whether Intuitive's prices for service have increased over time. Figure 4 below shows average annual service plan prices when measured across all U.S. customers over the period 2012 to 2021 and without controlling for service plan or system type. The prices displayed in the graph have not increased over the period and have slightly decreased when measured in real terms.

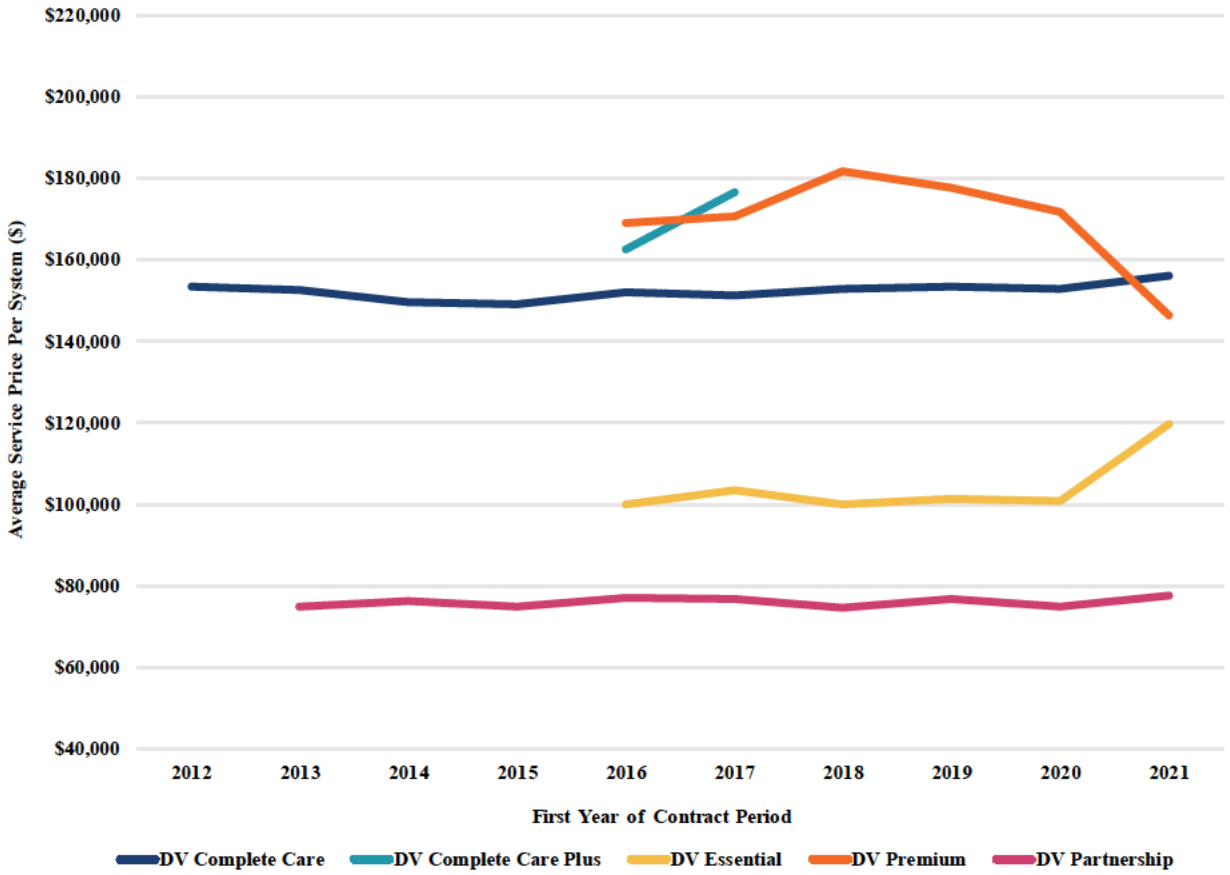
FIGURE 4
AVERAGE ANNUAL SERVICE PLAN PRICES, BASED ON INITIAL YEAR OF CONTRACT PERIOD



Sources and Notes: Based on Intuitive's Servicing Contracts data. In the figure, each contract's annual amount is recorded under the first year for the contract period. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). See Appendix A for discussion of data preparation.

148. Figure 5 below shows average annual service plan prices when calculated for each specific type of service plan. More than 94 percent of customers were enrolled in the "dV Complete Care" plan during this period.[377] The prices displayed in the graph generally have not increased over the period.

FIGURE 5
AVERAGE ANNUAL SERVICE PLAN PRICES, BY SERVICE PLAN TYPE

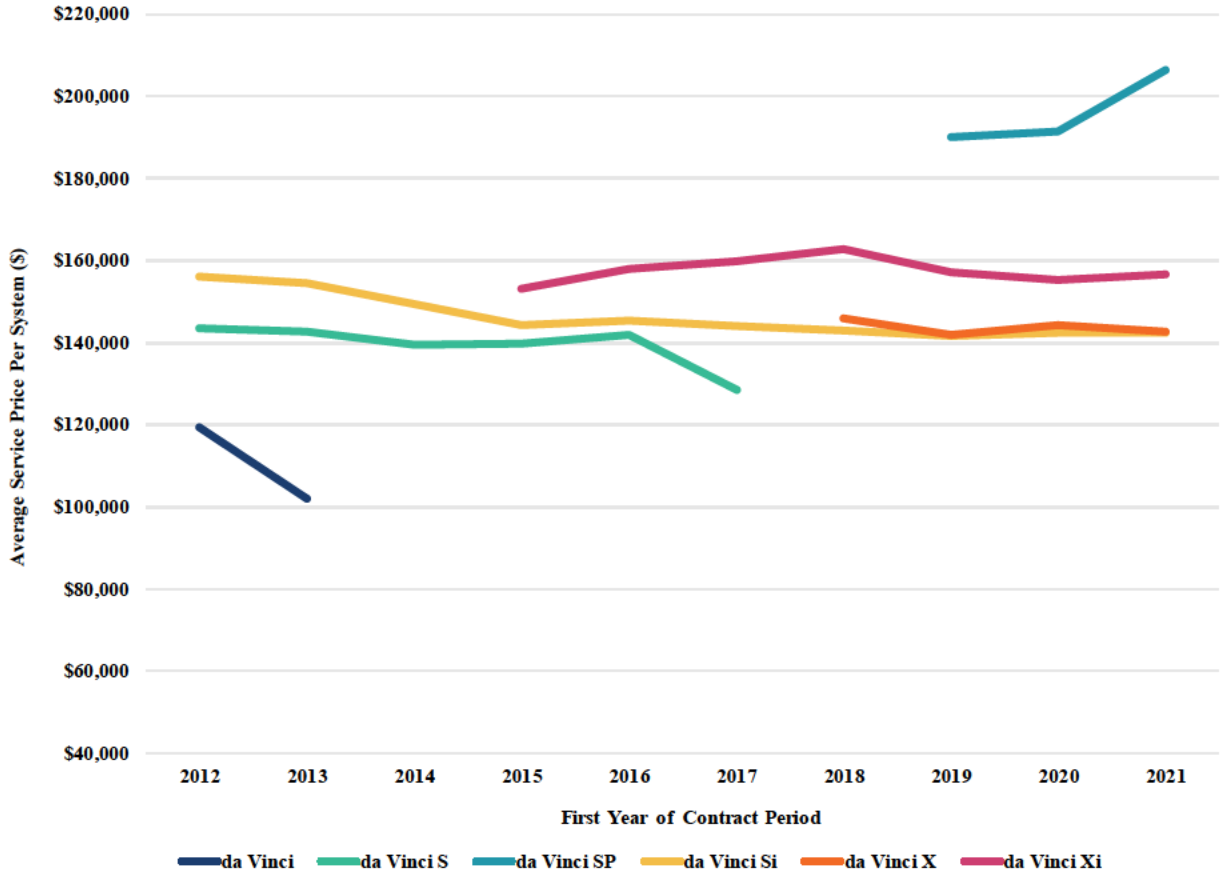


Sources and Notes: Based on Intuitive's Servicing Contracts data. In the figure, each contract's annual amount is recorded under the first year for the contract period. See Appendix A for discussion of data preparation.

149. I also consider average prices when calculated by specific da Vinci System model. These prices are displayed in Figure 6 below. The prices displayed in the graph have generally not increased over the period.

[377] *See* Service Price Workpaper.

FIGURE 6
AVERAGE ANNUAL SERVICE PLAN PRICES, BY SYSTEM MODEL



Sources and Notes: Based on Intuitive's Servicing Contracts data. In the figure, each contract's annual amount is recorded under the first year for the contract period. See Appendix A for discussion of data preparation.

150. I also examine whether individual customers faced higher service plan pricing upon renewal when compared to their initial service plan prices, among customers identified as renewing for the first time and where the service plan does not change at renewal. This comparison is shown in Appendix A, Table A-6. On average during the period, 69 percent of the renewing contracts renewed at the same price as the initial service plan, 28 percent renewed at a lower price, and 3 percent renewed at a higher price. These results indicate that service plan prices were generally not higher on renewal when compared to the initial service plan.

D. INTUITIVE HAS NOT BEEN PRICE DISCRIMINATING AGAINST ANY GROUP OF CUSTOMERS

151. As an additional examination, I look at whether there is evidence of apparent price discrimination against customers that plausibly are more dependent on the da Vinci Surgical System (i.e., groups that perform a large proportion of da Vinci-eligible procedures using the da Vinci Surgical System). Such evidence could indicate an exercise of monopoly power.

152. It is worth noting that Professor Elhauge also assesses whether Intuitive price discriminates across different groups of customers and concludes that Intuitive does not price discriminate.[378] He states: "Intuitive charged all customers the same price, with the rare exception of small incentive-based discounts, usually related to volume, rather than price discriminating among different customers."[379] However, Professor Elhauge does not attempt to reconcile this finding with his conclusions about Intuitive's alleged monopoly power.

153. In this initial analysis, I divide Intuitive's customers into two equally-sized groups (a "high" group and "low" group) based on the da Vinci Surgical System's relative share of procedures at each hospital during 2021. The group determinations are made using the IQVIA data for the da Vinci procedures covered in Table 1 above.[380] I then examine whether instrument prices for the high-share group are materially higher than the low-share group's prices, by comparing prices for these two groups within the same year. I also examine whether the price trends shown in the preceding section, which are measured across all customers, do not hold for either of these two groups of customers.

154. Figure 7 below shows this comparison using prices expressed per procedure. As shown in the figure, the customer price per procedure for the high-share group is generally at or below the price for the low-share group. It is also evident that the two groups experience similar price

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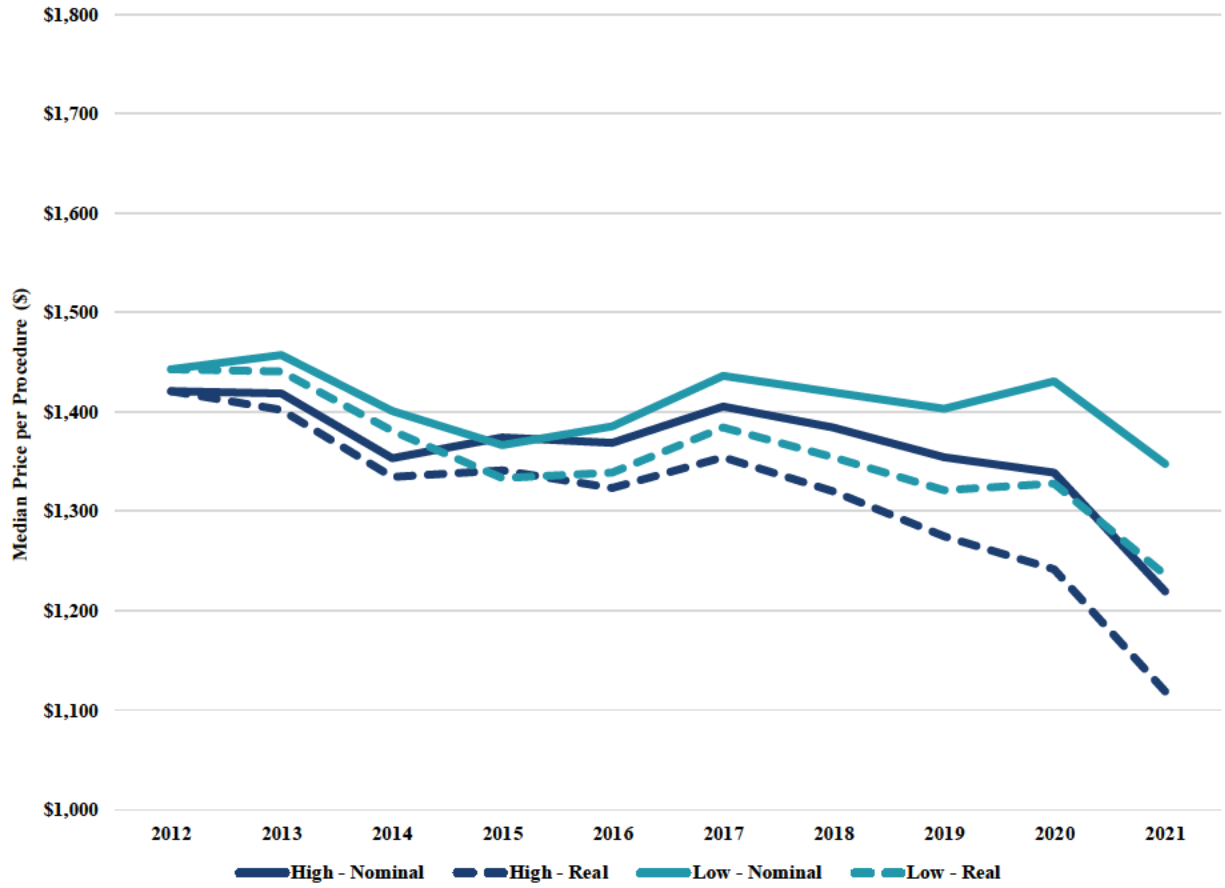
[378] Elhauge Report, ¶ 164.

[379] *Id.*

[380] The data for each customer are aggregated to the IDN level ("Integrated Delivery Network") where hospital entities that are related under common ownership or a group purchasing affiliation are combined. *See* discussion in Appendix A.

trends during the period. Trends shown in Figure 7 are not indicative of an exercise of monopoly power.

FIGURE 7
INSTRUMENT PRICES FOR HIGH VS. LOW SHARE CUSTOMERS EXPRESSED PER PROCEDURE



Sources and Notes: Prices per procedure relate net sales amounts calculated from Intuitive's I&A sales data to Intuitive's procedures data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the median da Vinci share of total procedures of 40 percent.

E. PROFESSOR ELHAUGE'S ASSESSMENT OF INTUITIVE'S PRICES AND MARGINS DEVIATES FROM STANDARD ECONOMIC APPROACHES

155. Professor Elhauge concludes that Intuitive's prices were "anticompetitively elevated," which is a flawed assessment, as I discuss below.[381] Professor Elhauge also concludes that Intuitive has monopoly power in part based on accounting measures of Intuitive's price-cost margins for components of its surgical system.[382] More specifically, he characterizes Intuitive's market power using measures of consumers' demand sensitivity to price changes—the Lerner Index and own-price demand elasticity—which are based on a single measure—Intuitive's accounting "contribution margins."[383] Professor Elhauge concludes that his calculated Lerner Indices are too high and his calculated own-price elasticities are too low, which effectively amounts to concluding that Intuitive's price-cost margins are too high, relative to cut-offs that have no direct connection to the markets where Intuitive competes or Intuitive's competitive conduct.[384]

156. First, as explained in Section III.C above, Intuitive always has sold its surgical system as a singular product,[385] and thus evaluating Intuitive's price-cost margins on components of its system in isolation may be misleading.

157. Second, it is well understood by economists that for metrics such as the Lerner Index and own-price demand elasticity to be useful for inferences about competition, the margin used to construct them must reflect a firm's relevant costs and competitive decisions.[386] The contribution margins used by Professor Elhauge do not capture all relevant costs nor do they reflect important

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381 *See*, e.g., Elhauge Report, ¶ 402.

382 Elhauge Report, ¶¶ 130-131, 188-189, and 235-236.

383 *Id.*

384 *Id.*

385 *See* Section III above.

386 *See* Kenneth G. Elzinga and David E. Mills, "The Lerner Index of Monopoly Power: Origins and Uses", *American Economic Review: Papers & Proceedings 101*, No. 3 (2011): 9; and Gregory Werden, "Demand Elasticities in Antitrust Analysis," *Antitrust Law Journal* 66 (1998): 393-394.

aspects of Intuitive's competitive strategies and actions, and thus Professor Elhauge's conclusions based on those accounting margins are incorrect as a matter of economics and fact.

1. Professor Elhauge makes inapt price comparisons in support of his conclusions

158. Professor Elhauge purports to show "[d]irect [e]vidence of [a]nticompetitively [i]nflated [p]rices" for EndoWrist instruments based on "several competitive benchmarks and yardsticks."[387] He concludes that but-for Intuitive's conduct, it would have "charged lower prices" for its own EndoWrists replacements and that "many buyers could have bought repaired EndoWrists at lower prices offered by rivals."[388]

159. For his first "benchmark," Professor Elhauge points to an internal Intuitive analysis that examines potential refurbished EndoWrist pricing contemplated in connection with its envisioned refurbishment initiative, Project Dragon. Specifically, a key document he cites appears to compare envisioned prices for Intuitive *refurbished* instruments against *new* EndoWrist list prices.[389] He states this comparison "makes sense" because "hospitals view repaired EndoWrists are [*sic*] functionally equivalent to replacement EndoWrists."[390] He then concludes "[these implied discounts] provide a reliable benchmark of the sort of discounts Intuitive would have offered if it had faced effective rival EndoWrist repair competition in a but-for world without the anticompetitive restraints."[391]

160. However, at best, Professor Elhauge's comparison—here between potential envisioned refurbished prices and new prices from the same OEM (Intuitive)—is an apples-to-oranges comparison that provides no support for his claim. The fact that Intuitive contemplated lower prices for refurbished instruments indicates differences in costs or quality or both between new

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[387] Elhauge Report, ¶ 350.
[388] *Id.*
[389] Elhauge Report, ¶ 352, citing to DeSantis (in *Rebotix*) Dep. Ex. 38 at -270, -287, and -290.
[390] Elhauge Report, ¶ 352.
[391] *Id.*

and used instruments. Moreover, as I discuss in Section VI.B below, evidence shows that Project Dragon did not launch because, after extensive research and testing into the feasibility of such a program, Intuitive found that the refurbishment program would be "cost prohibitive" relative to manufacturing new EndoWrist instruments (at the envisioned price levels).[392] So not only is this comparison baseless, but also Professor Elhauge's benchmark relies on hypothetical discounts that were later determined to be unachievable.

161. For Professor Elhauge's second comparison, he states "[o]ne yardstick with which to compare the price of EndoWrists is the price of instruments used with other MIST surgery robots." To carry out this comparison he cites to two documents which compare per-procedure instrument prices between the da Vinci Surgical System and one other system—the Senhance—which is manufactured by TransEnterix. Both documents state that Intuitive's instrument pricing is higher than that of the Senhance on a per-procedure basis.[393] Based on this, he concludes "these much lower per-procedure prices for rival MIST surgery instruments indicate that the competitive price for EndoWrists was inflated by the anticompetitive restraints."[394]

162. However, Professor Elhauge's conclusion here is not supported by the evidence he provides. As an initial matter, this evidence appears to be both selective and misleading because it is based

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[392] Morales 30(b)(1) (11/9/2022) Dep. Tr 235:21-236:18. *See also* Morales 30(b)(1) (11/9/2022) Dep. Tr. 172:23-173:20. *See also* Goodson 30(b)(1) Dep. Tr. 73:6-74:10.

[393] Elhauge Report, ¶ 353, quoting passages from two documents which compare instrument pricing between the Senhance and da Vinci Systems. The first source states: "[A] recent internal review by our local healthcare system revealed an average instrument cost of $3,400 per da Vinci procedure, which is significantly higher than the projected $800–1,600 instrument costs for Senhance" (quoting from Perez and Schwaitzberg, Robotic Surgery: Finding a Value in 2019 and Beyond, ANNALS OF LAPAROSCOPIC AND ENDOSCOPIC SURGERY, Vol. 4, May 2019). Professor Elhauge states that his second source, a 2018 PiperJaffray report, "found that Senhance had a per procedure cost 'roughly half of what ISRG [Intuitive] charges' and the low per-procedure pricing was 'mainly driven by reusable instruments with minimal disposables per case.'" Although not raised by Professor Elhauge, this document (Intuitive-00364420 at -423) also states that the initial system prices for Senhance are "…in line with the high end robotic platforms at around $1.5M (inclusive of instrument trays)…."

[394] Elhauge Report, ¶ 353.

only on comparisons against the Senhance system. For example, the second source he relies on, a 2018 PiperJaffray report, also provides per procedure costs for the Flex,[395] the second rival system Professor Elhauge includes in his purported MIST market and in his Table 1. This document's reported per-procedure costs for the Flex system do not significantly differ from those reported for the da Vinci System models.[396] Although I cannot verify the per-procedure cost comparisons reported in the document, I raise this only to point out that Professor Elhauge appears to selectively ignore information provided there which does not support his conclusions.

163. More importantly, notwithstanding the selective nature of the comparisons Professor Elhauge presents, such price comparisons do not provide adequate support for his conclusions as a more general matter of economics, because they apply to differentiated products. It is well known to economists that prices may differ significantly between products in differentiated product markets.[397] Specifically, it is incorrect to compare prices of EndoWrists to prices of instruments for other robotic systems without considering any differences in the quality or other characteristics of these systems that would otherwise make them not directly comparable. Indeed, Professor Elhauge highlights substantive differences between the two systems and their instruments earlier in his report.[398] These differences provide strong reasons for why the da Vinci System and Senhance, as well as Flex for that matter, should not be viewed as being directly comparable in terms of price. He states:

> "This low own-price demand elasticity is consistent with the reality that

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[395] Intuitive-00364420 at -428 stating: "The company has raised over $150M to date and prices the system around $1 M with **per procedure cost in the $1,500-$2,000 range**." (emphasis added).

[396] This comparison is based on the per-procedure cost estimates provided by PiperJaffray in Intuitive-00364420 (at-428 and -440) for the Flex and da Vinci systems. The Flex system estimates are: "1,500-$2,000 range" (at -428) and "~$1,400" in row 8 of Exhibit 21. The da Vinci System estimates are: $1,300-$1,500 for the model Si (row 1 of Exhibit 21) and $1,750-$2,000 for the X/Xi models (rows 2-3 of Exhibit 21).

[397] Pindyck and Rubinfeld at pp. 465-467 ("…markets often have at least some degree of product differentiation. Market shares are determined not just by prices, but also by differences in the design, performance, and durability of each firm's product. In such cases, it is natural for firms to compete by choosing prices..."). *See also* my discussion of differentiated products in Section IV.B above.

[398] Elhauge Report, ¶ 132.

> customers not only found that other alternatives were not a reasonable substitute for MIST surgery robots, but also found the da Vinci far more attractive than other MIST surgery robots. Significant attractions of the da Vinci robot included its abilities to work with wristed instruments and to eliminate hand tremors. In contrast, the Senhance has had, at best, a limited offering of wristed instruments. Surgeons have opined that the Senhance 'does not stack up to da Vinci" and is a 'piece of junk.' The Flex's instrumentation has been limited to 'manual endoscopic Instruments' (i.e., no tremor control)." (Elhauge Report, ¶132)

164. Professor Elhauge's assessment of Intuitive's pricing is incomplete for another important reason. As explained above in Section III.A, the prices of the components of Intuitive's da Vinci surgical solution are complements. Hence, it is incorrect to assume, as Professor Elhauge implicitly does in his but-for pricing comparisons, that the sum of the individual prices of the components would be equal to or below the sum of would-be prices for the individual components in his envisioned but-for world.

165. Lastly, to support his opinion that Intuitive's EndoWrist pricing was anticompetitively high, Professor Elhauge uses a benchmark based on "[t]hird-[p]arty IRC [p]rices and [p]enetration."[399] He states: "One way in which hospitals were overcharged was by being forced to purchase new EndoWrist replacements from Intuitive instead of lower-cost EndoWrist repair."[400] He then compares the average prices for EndoWrists that were reset by third parties, Restore, Rebotix, and SIS, to the prices that Intuitive charged for new EndoWrist instruments and shows that third-parties charged lower prices to reset instruments than Intuitive charged for its new EndoWrists.[401] For reasons I discuss in Section VI.B below, the prices charged by third parties for resetting instruments do not provide suitable benchmarks for comparison to assess whether EndoWrists prices were elevated. Third-party resets are fundamentally different in terms of cost

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[399] Elhauge Report, ¶¶ 353-354.
[400] Elhauge Report, ¶ 354.
[401] Elhauge Report, ¶ 356, Table 3.

and quality (whether real or perceived) than new EndoWrist Instruments.[402] Moreover, unlike Intuitive, these third-party companies did not have the same degree of research and development or investment under uncertainty to recover when setting prices.[403]

2. Professor Elhauge misapplies the Lerner Index in support of his conclusions

166. It is by design that a company's gross or variable margins focus exclusively on costs that vary over a short time frame and do not consider other important costs of bringing a product to market, such as those associated with research and development.[404] Such costs factor into a company's strategic decision making over a longer time horizon. It is well-accepted by economists that an assessment of a company's profits in relation to monopoly power should consider the investment costs associated with developing the company's products, the timing of those investments, as well as the riskiness of these investments under uncertainty.[405] Hence, Professor Elhauge's use of contribution margins to attribute monopoly power to Intuitive is inappropriate and inconsistent with economic practices.

167. The Lerner index is derived from the deviation of price from marginal cost.[406] It is well established in the economic literature that fixed costs often cause price to deviate from marginal cost, especially in industries with significant research and development (R&D) or other investment expenditures, and that this is in no way an indication of competitive harm. For example:

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[402] Howe Report, ¶ 103.

[403] *See* Section V.E.3.

[404] For a discussion of why "variable margins" can lead to "serious biases" in measuring a company's returns, *see*, e.g., Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, Fourth Edition (Boston: Pearson Education, Inc., 2015) ("Carlton and Perloff") at p. 278, who state "That is, they tend to ignore capital, research and development, and advertising costs. This approach may lead to serious biases."

[405] *See*, e.g., Franklin M. Fisher and John J. McGowan, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review* 73, No. 1 (1983): 82-97.

[406] Abba P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly." The *Review of Economic Studies 1*, No. 3 (1934): 157–175.

a. Lindenberg and Ross (1981) write: "[…] Lerner index is inadequate in explaining market power because it does not recognize that some of the deviation of P from MC comes from either efficient use of scale or the need to cover fixed costs and does not contribute to market value in excess of replacement cost."[407]

b. Crane (2014) writes: "The Lerner Index is misaligned with the competitive counterfactual since most markets could not function if prices were equated to marginal cost. This is well recognized as to dynamic markets, like pharmaceuticals, where large fixed investments in research and development (R&D) are necessary to the creation of new technologies."[408]

c. Elzinga and Mills (2014) write: "Rather, these firms' price-cost margins may reflect 'superior skill, foresight and industry' that is the *very result of competition*. Or, a relatively high Lerner Index may reveal nothing more than the necessity of covering fixed costs."[409]

d. Simons and Coate (2014) write: "There is widespread agreement that the Lerner Index cannot be used … [as] a reliable measure of market power for antitrust purposes, because it suggests that market power exists whenever price is even modestly above some empirical measurement of marginal cost. Prices above estimates of marginal cost are ubiquitous throughout the economy because of the existence of nontrivial fixed costs (for example, relatively high fixed costs exist for retailers, software producers, and any industry with material R&D programs). If the Lerner Index were used to measure market power in antitrust cases, courts would find market power everywhere a proxy for marginal cost differs from price."[410]

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[407] Eric B. Lindenberg and Stephen A. Ross, "Tobin's Q Ratio and Industrial Organization", *Journal of Business*, (1981): 28. "P" and "MC" refer to price and marginal cost, respectively.

[408] Daniel A. Crane, "Market Power Without Market Definition", *Notre Dame Law Review*, 90 (2014): 31.

[409] Kenneth G. Elzinga and David E. Mills, "The Lerner Index of Monopoly Power: Origins and Uses", *American Economic Review: Papers & Proceedings 101*, No. 3 (2011): 9. (emphasis in original)

[410] Joseph J. Simons and Malcolm B. Coate, "United States v. H&R Block: An Illustration of the DOJ's New But Controversial Approach To Market Definition", *Journal of Competition Law & Economics 10*, No. 3 (2014): 552-553.

168. As a matter of economics, the Lerner index does not prove market power, nor does it provide a defined threshold for what is an acceptable price-cost margin. However, Professor Elhauge relies extensively on the Lerner Index to support his conclusions about Intuitive's asserted monopoly power and he does so without acknowledging important limitations. In addition, he also appears to suggest there are defined thresholds of the Lerner Index that indicate monopoly power, which, as a general matter of competition economics, there are not. Professor Elhauge states:

> "In short, Intuitive's high contribution margins indicate that it was able to maintain prices for the da Vinci robot that were **well above even 'reasonably' competitive levels**. Indeed, they indicate that Intuitive was able to charge prices that were 25-50% above the top of **the normal range for a 'reasonably' competitive Lerner Index level**. This is well above the typical 5% threshold for a SSNIP test and a strong indicator of power over price. Da Vinci's high profit margins thus directly indicate a monopoly power to raise price above competitive levels." (Elhauge Report at ¶ 130, emphasis added)[411]

169. Professor Elhauge quotes from an American Bar Association book on the use of econometrics to support his above characterization for what he calls "…the normal range for a 'reasonably' competitive Lerner Index level." He provides that quote as a footnote to the above paragraph in his report and it reads:

> "In a perfectly competitive market, price is driven to marginal cost, making the Lerner Index equal to zero. On the other hand, as firms gain market power, they are able to sustain price above marginal cost, leading to a higher Lerner index. In highly competitive industries, the Lerner index may be around 0.1, **whereas in industries that are 'reasonably' competitive, the Lerner Index may be 0.4 or**

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[411] Professor Elhauge also presents similar discussions in parallel for EndoWrists (¶ 188) and for servicing (¶ 235). Both in the above passage and in those discussions, he also appears to conflate levels of the Lerner Index (when measured relative to his purported "reasonably competitive" threshold) with a SSNIP test. This comparison is not consistent with economic practices for using a SSNIP. He also provides no support for why such a comparison would lead to his conclusion here that this provides "…a strong indicator of power over price." (Elhauge Report, ¶ 130).

> **0.5, but there is no defined rule for identifying market power.**" (Elhauge Report at ¶ 130, fn. 313, emphasis added)

170. In spite of the qualification at the end of the quote ("there is no defined rule for identifying market power"), Professor Elhauge uses it to support his conclusion that the Lerner Indices he calculates for Intuitive (and by extension Intuitive's price-cost margins) are too high.[412] He also ignores the paragraph following the above quote cautioning readers not to use the Lerner Index as a benchmark for defining "acceptable" profit levels. It states:

> "**One limitation of the Lerner Index is that it does not provide a benchmark profit level that is acceptable for different industries. The only benchmark is perfect competition, where the Lerner Index is zero.** Thus, a common approach is to look at *changes* in the Lerner Index for a given firm over time. A large increase could indicate a shift toward increased market power."[413]

171. Finally, the above passage includes the following footnote that explains why Professor Elhauge's inferences here are incorrect as a matter of economics:

> "**In some industries, the Lerner Index can systematically fail to accurately measure competition.** For example, industries in which quality of service is a large driver of price (high-end restaurants are an example) may have higher profit margins because of the quality of product offered, even though they do not have market power...**Also, high-technology industries that require large investments in R&D require high profit margins to recoup the R&D expenses. Such profit margins are <u>not due to market power</u>.**" (ABA Handbook at §10.C.2.a, emphasis added)

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412 *See*, e.g., Elhauge Report, ¶ 130.

413 ABA Section of Antitrust Law, Econometrics 247 (2d ed. 2014). ("ABA Handbook")), § 10.C.2.a, emphasis added here in bold and in original in italics.

172. Professor Elhauge also presents his approximation of Intuitive's own-price elasticity of demand as "[a]nother source of evidence" to evaluate market power beside the Lerner index.[414] However, because he simply imputes Intuitive's own-price elasticity of demand as "one divided by its Lerner Index,"[415] this does not provide any new information beyond his first use of the Lerner Index itself in support of his conclusions. For the reasons I discuss above, Professor Elhauge's measurement and application of the Lerner Index is inapt and does not support his conclusions. Therefore, his transformation of the Lerner Index into an imputed own-price elasticity of demand also suffers from the same flaws discussed above.

3. Professor Elhauge misinterprets Intuitive's ex ante commitment to invest in quality as a demonstration of market power

173. To better understand the importance of Intuitive's investment costs on its strategic investment and pricing decisions, consider the following simplified example.

a. Consider a firm, Deviceco, which makes medical devices. Developing a new medical device requires $10 million. Costs at the development stage may include research, and recruitment and remuneration of personnel. These costs will be incurred by the firm regardless of the number of units sold. In economics, such costs are called fixed costs.

b. Once the device is developed, the marginal cost of selling this device to an additional customer is $1. Costs at the distribution stage may include marketing, and the infrastructure required to distribute the device. In economics, the cost incurred to produce and distribute an additional unit is called marginal cost.

c. Deviceco expects to recover both the marginal cost of selling an additional unit ($1 per unit) to consumers, as well as the fixed costs associated with development of the product ($10 million for the product).

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[414] Elhauge Report, ¶ 131.
[415] Elhauge Report, fn. 315.

174. Even if the device was priced at $11 per unit, Deviceco would need to sell 1 million units in order to recover its fixed costs and break even. However, its Lerner index, formulaically defined as (price – marginal cost)/price, would be 0.91,[416] which, based on his assessment of Intuitive's margins, would lead Professor Elhauge to conclude that Deviceco has monopoly power.[417]

175. Note that I constructed the stylized example with no regard for whether this is a one-of-a-kind revolutionary device contributing to advanced research, or an incremental innovation operating in a competitive environment. To put it differently, the Lerner index of 0.91 does not imply, one way or another, whether a firm operates in a competitive environment or not.[418]

176. Further, my stylized example did not consider the possibility that Deviceco's $10 million investment could result in failure. In the real world, many investments carry a possibility that the project may not be successful.

d. Let us now assume that Deviceco sells 11 million units, earning a $100 million in profits.[419] Let us also assume that when it made its investment, Deviceco had a 10 percent chance of being successful and earning $100 million and a 90 percent chance of failure.

177. If Professor Elhauge were to analyze the above example, he might conclude those profits are too large: Deviceco is earning $100 million on only a $10 million investment, a return of 900 percent! Deviceco must be a monopolist. But, this ignores the fact that when Deviceco made its investment in competition with other competitors it was a breakeven proposition (i.e., the 10

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[416] Abba P. Lerner, "The Concept of Monopoly and the Measurement of Monopoly." *The Review of Economic Studies 1*, No. 3 (1934): 157–175.

[417] *See*, e.g., Elhauge Report, ¶¶ 130-131.

[418] Tibor Scitovsky, "Economic Theory and the Measurement of Concentration", *Business Concentration and Price Policy, NBER*, (1955): 105 ("Lerner's index […] measures market imperfection rather than monopoly or oligopoly power. The margin between price and marginal cost would not be zero even in the complete absence of oligopoly, which is only one of several factors that account for this margin.").

[419] Profit = Revenue – Cost. Revenue = Price*Quantity = $11*11 million = $121 million. Costs include the fixed cost of $10 million, as well as the per-unit cost of $1 to sell 11 million units, or $10 million + $1*11 million = $21 million. Profit, therefore, equals $121 million - $21 million = $100 million.

percent chance of obtaining anticipated profit of $100 million yields an expected value of $10 million, which is equivalent to the cost of Deviceco's investment). Note that at a price low enough to bring the Lerner index below the thresholds set forth in Professor Elhauge's report as representing "reasonably competitive markets" (0.4 to 0.5),[420] it would make no sense for Deviceco to invest in the development of its product in the first place. In short, Professor Elhauge's analysis would miss any acknowledgment of the predictable adverse effect on Deviceco's investments its inability to earn such returns would have.

178. As I discuss in Section VI.C below, Intuitive has faced significant economic costs of innovation over time. Moreover, as discussed above Section II.C.a, one aspect of Intuitive's innovation has involved the development of four generations of surgical systems that have become available to customers over time. Intuitive's continued investment is inconsistent with the behavior of a monopolist operating in a world absent competition.

179. Evidence also indicates that risk—which Intuitive breaks into "four core risk buckets" including "[c]linical risks," "[t]echnical risks," "[r]eimbursement & [r]egulatory risks," and "[c]ompetition risk"—factors into Intuitive's investment decisions.[421] In an accompanying workbook to Intuitive's 2020 presentation titled "Long-term opportunity portfolio assessment," Intuitive calculates values adjusted for "Risk and Strategic Benefit" and ranks opportunities based on assessments of various factors, including risk.[422]

180. Professor Elhauge claims that Intuitive has the ability to exclude third parties and that this is a demonstration of market power.[423] Intuitive committed to its business model up front to ensure quality and cover investment costs under uncertainty.[424] As documented in its early business

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[420] Elhauge Report, ¶ 130.

[421] Intuitive-01172899 ("Long-term opportunity portfolio assessment," November 6, 2020) at -902.

[422] Intuitive-01172908 ("Opportunity portfolio assessment_v50.xlsx"), tab "Project_Ranking Tool."

[423] *See*, e.g., Elhauge Report, ¶¶ 134 and 190.

[424] DeSantis (in *Restore*) Dep. Tr. 48:10-19 ("Q. Why hasn't Intuitive just lowered its prices for the new EndoWrist instruments to address the need from customers for lower prices? A.

plans, Intuitive entered the market as an alternative to laparoscopic or open surgical solutions.[425] Given that this business model long predates the entrance of third-party "rivals" and was developed when the competitive landscape was primarily open and laparoscopic surgical modalities, Intuitive's actions are not a demonstration of market power, but rather reflects a go-to-market strategy against existing solutions.

VI. INTUITIVE'S CONDUCT HAS LEGITIMATE BUSINESS JUSTIFICATIONS AND BENEFITS HEALTHCARE PROVIDERS, SURGEONS, AND PATIENTS

181. Professor Elhauge claims that Intuitive's "exclusionary restraints" have "no countervailing procompetitive justifications."[426] Specifically, Professor Elhauge presents purported evidence to support his assertion that the following six justifications lack "economic merit": transaction costs, safety/quality, reputational/liability concerns, compatibility costs, free-riding/innovation concerns, and allegedly superior financial terms.[427] However, Professor Elhauge's discussion itself is meritless because (1) he misrepresents the economic principles underlying the benefits of integration and bundling and (2) he misconstrues the evidence that he relies on. As I explain below, despite Professor Elhauge's claims to the contrary, Intuitive's conduct has procompetitive business rationales. Hence, irrespective of any competitive harms, which, as I explained above, I see no evidence of, Intuitive's challenged conduct is justified as a matter of economics.

…[w]e've never raised prices. We haven't lowered them. We -- We take the earnings, reinvest them into making better products for the surgery, so that's, you know, essentially been our model."). A document describing Intuitive's business plan dated 1995 describes various characteristics of the Resposable Transmission Unit ("RTU"). Specifically, it states, "During the design phase, the company will work closely with its patent attorneys to insure that the interface design … between RTU and disposables, have ironclad design patentability. This will secure … that other manufacturers will be unable to manufacture unauthorized and possibly dangerous RTUs and disposables." Intuitive-00595673 at -682.

425 Intuitive-00595673 at -677-678.

426 Elhauge Report, § VI.F (*see* section heading where the capitalization is omitted).

427 Elhauge Report, ¶ 377 and ¶¶ 378-391.

182. Even if one considers the components of a surgical system (such as Intuitive's da Vinci Surgical System) as "distinct" products, standard economic principles explain why selling the components as an integrated product or "bundle" can benefit consumers. These include:

a. Bundling can insure the supplier against risk, including risks to patient safety, particularly when uncontrolled third parties do not have the same incentives as the supplier to preserve product reputation.

b. The insurance against risks that "bundling" provides can create (and preserve) incentives for innovation.

c. Bundling complementary products can reduce costs for the consumer.

183. This section shows that by selling an integrated product (or a "bundled" product if the components are deemed to be "distinct"), Intuitive is able to achieve these procompetitive objectives. I first provide an overview of the economics of bundling with an emphasis on when bundling promotes procompetitive benefits to patient safety and innovation. I then explain how Intuitive's product design and business practices mitigate risks, including risks to patient health, and promote ongoing innovation. Finally, I explain how Intuitive is offering consumers a superior financial deal by selling a system rather than individual components. As a corollary to this analysis, I explain why the purported savings of the putative class from elimination of the challenged conduct are misleading, particularly after accounting for increased risks to patient safety.

A. BUNDLING HAS PROCOMPETITIVE JUSTIFICATIONS

184. Two related economic concepts that arise in the discussions about packaged or integrated products are "bundling" and "tying."[428] Bundling is the "[p]ractice of selling two or more

[428] In the context of this case, the economic arguments for "tying or "bundling" equally apply to "exclusive dealing." By entering into the SLSA with Intuitive, customers acknowledge that they will not allow unauthorized third parties to "modify, disassemble, reverse engineer, alter, or misuse" any component of the da Vinci Surgical System (*see* ¶ 84 above). This contractual arrangement effectively "bundles" the components of the system.

products as a package."[429] For example, cable networks often sell a menu of channels as a package.[430] Tying is the "[p]ractice of requiring a customer to purchase one good in order to purchase another."[431] The distinction between tying and bundling is that in the case of tying the tied product is available for sale on its own, whereas bundled products always are sold together.[432] Because the components of the da Vinci Surgical System (particularly the da Vinci platform, EndoWrist instruments, and system servicing) are essential to the function of the overall system and are sold through the same contractual arrangement, the da Vinci Surgical System is more properly described as a bundle. However, as a matter of the relevant economics here, the distinction between bundling and tying is inconsequential.[433]

185. In his "primer" on tying cases, Professor Jean Tirole (winner of the Nobel Prize in Economics in 2014 "for his analysis of market power and regulation"[434]) names six "rationales other than anticompetitive ones" as to why a firm may choose to tie two of its products, one of which is a monopoly product "M" (tying product) and the other a potentially competitive product "C" (tied product):[435]

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[429] Pindyck and Rubinfeld at p. 419. Economists also use the terms "pure bundling" and "mixed bundling," where "pure bundling" refers to two or more products that are only offered together and "mixed bundling" are two or more goods are sold together and also separately. *See*, e.g., Pindyck and Rubinfeld at p. 423.

[430] Pindyck and Rubinfeld at p. 426.

[431] Pindyck and Rubinfeld at p. 428.

[432] Jean Tirole, "The Analysis of Tying Cases: A Primer," *Competition Policy International* 1, No. 1 (2005): 8 ("The difference between tying and pure bundling is that the tied product is available on a stand-alone basis under tying, but not under pure bundling. This distinction however is inconsequential if, as we assumed for illustrative purposes, the tied product is valueless without the tying product.") ("Tirole").

[433] Professor Elhauge refers to the challenged conduct as a "requirements tie" which means that Intuitive required that purchasers of the da Vinci Surgical System to purchase all of their EndoWrist instruments and da Vinci System servicing from Intuitive. *See*, e.g., Elhauge Report, ¶¶ 140, 196. The relevant economics of bundling/tying discussed in this section and elsewhere in this report also apply to Professor Elhauge's alleged "requirements tie."

[434] "Jean Tirole – Facts," The Nobel Prize, accessed January 6, 2023, https://www.nobelprize.org/prizes/economic-sciences/2014/tirole/facts/.

[435] The rationales listed in this paragraph are based on Tirole at pp. 14-17. *See* Tirole at p. 4 for his terminology of the monopoly and potentially competitive products. The rationales listed

a. Tying saves on "transaction costs" for the consumer, who would otherwise need to make additional choices or seek components from additional sources;

b. Tying reduces "compatibility costs" for the manufacturer, who otherwise would need to incur costs to ensure interoperability between its product(s) and those of other manufacturers;

c. Tying allows manufacturers to "protect M's reputation vis-à-vis consumers or to insulate M against assignment of liability when a product malfunctions because of an independent producer's poor design;"[436]

d. Tying may prevent leakage of "proprietary information embodied in the design of the M product, such as information about general purpose functionalities that naturally lie in product M rather than the complementary product C;"

e. The low cost of C (viewed as being tied to M) may be a "legitimate price response" in certain situations, such as encouraging consumers to try a new "product with unknown quality;" and

f. Tying may be an efficient way to "[meter]… demand and prices to depend on customer usage," such that customers with relatively lower willingness to pay for M would not be excluded.[437]

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in Tirole show that even if a firm owns a "monopoly" product that it sells in combination with another product, the firm may have rationales other than anticompetitive ones for doing so. This should not be misinterpreted as an indication that Intuitive has monopoly power over any product, which, as I have explained in Sections III-V, they do not.

[436] Professor Tirole further explains, "A tie can then be viewed as solving a problem of moral hazard in teams when third parties (such as consumers or the courts) do not have the technical expertise or the information necessary to know who is at fault." *See* Tirole at p. 15.

[437] Tirole at p. 16. It is worth acknowledging that, in the article, Professor Tirole also describes scenarios in which tying may serve to either "monopolize the competitive market" or "protect its monopoly position in the monopoly segment" (Tirole at p. 17). Regarding the first point, tying may be an attempt to monopolize the competitive market when it forecloses a portion of C from rival companies, namely the consumers who demand the bundle of M and C products. Regarding the second point, tying may be a means to protect the company's monopoly over product M when it discourages entry in M because of the lack of competition in C. In this case, Plaintiffs allege that Intuitive is attempting to monopolize effectively C by foreclosing customers who demand the bundle, which would be all customers since the components of Intuitive's surgical system only function as a system. I do not find this scenario to be applicable with respect to Intuitive's conduct because (1) Intuitive does not

186. Although several of these factors are relevant to Intuitive's business practices, as discussed below, evidence indicates that one of the most important reasons for Intuitive's challenged conduct relates to item (c) above—selling the da Vinci Surgical System as an integrated product allows Intuitive to maintain strict control of the components that are used with its system, which protects patient safety, as well as Intuitive's reputation and financial viability.[438] I discuss this feature of Intuitive's conduct in more detail in the next section.

B. INTUITIVE PROTECTS PATIENTS BY SELLING AN INTEGRATED PRODUCT

187. Intuitive's challenged conduct would be justified even if discrete antitrust markets for the components of the da Vinci Surgical System were deemed to exist. For example, the integrated system design allows manufacturers to avoid a potential "principal-agent problem," which is a well-known concept in economics when misaligned incentives can lead to undesirable outcomes.[439] The principal-agent problem arises when the agent (e.g., a third-party company) chooses actions to its own benefit instead of actions that achieve the goals of the principal (e.g.,

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possess the "monopoly power" in the tying market to foreclose the alleged market (*see* Section IV above) and (2) third parties have not been foreclosed from legitimate markets for medical equipment repair (*see* Section VII below).

[438] *See* James D. Dana Jr. and Kathryn E. Spier, "Bundling and quality assurance," *The RAND Journal of Economics* 49, No. 1 (2018): 128-154 (e.g., "This article argues that bundling may be necessary to assure the quality of experience goods when monitoring is private and imperfect" at p. 129).

In addition, Professor Elhauge appears to acknowledge that, for an alleged tie to be anticompetitive, the accused firm must have monopoly power. *See* Elhauge Report, ¶ 259 ("That hospitals 'voluntarily' and/or 'knowingly' agreed to the tie (by signing onto the sales agreement when buying the da Vinci) does not affect the economics of the tying restraint here because their agreement was procured by tying those restraints to access to monopoly products."). As I discussed above in Section IV, the evidence is consistent with Intuitive not being positioned to exercise monopoly power in the alleged "tying" market. Moreover, as shown in Section V, Intuitive's pricing behavior in the alleged "tying" and "tied" markets is inconsistent with the behavior of a firm exercising monopoly power. Given that Intuitive acts competitively, the alleged tie would not be anticompetitive.

[439] *See* Pindyck and Rubinfeld at pp. 645-651.

the OEM).[440] In the context of medical equipment repairs, the OEM has strong incentives to maintain the quality of its product—particularly with respect to patient safety—given the risks of reputational harm and financial losses.[441] A third-party company may not have the same incentives or ability to protect the product reputation and quality for reasons such as (i) it does not have as much at stake if something goes wrong, (ii) it has lower costs of switching to other devices if its services go awry, and (iii) it lacks the technical knowledge to know when modifications could damage the device. Although the economics literature has proposed ways that may address the principal-agent problem, these remedies can be costly and inefficient for the OEM.[442] By creating an integrated product, the OEM may be able to avoid having to monitor and enforce stringent standards on potential third parties to ensure that its product remains at the highest quality.

188. Intuitive faces a principal-agent problem where third-party companies and healthcare providers do not have the same incentives as Intuitive to ensure the highest level of patient safety and thereby preserve and enhance the da Vinci brand. By selling an integrated system, Intuitive maintains a measure of control over the clinical quality provided by the da Vinci Surgical System, protecting patients from malfunctions, and protecting Intuitive's reputation and financial viability in the process.

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[440] Professors Pindyck and Rubinfeld describe the principal-agent problem as follows: "A principal-agent problem arises when agents pursue their own goals rather than the goals of the principal" (Pindyck and Rubinfeld at p. 646).

[441] For example, in the U.S., adverse events associated with medical devices are reported to the FDA and publicized on the FDA's website; *see* "MAUDE – Manufacturer and User Facility Device Experience," U.S. Food and Drug Administration, accessed January 6, 2023, https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm ("MAUDE").

[442] For example, *see* Jeffrey M. Perloff, Microeconomics, Seventh Edition (Boston: Pearson Education, Inc., 2015), 653-671 (on the principal-agent problem). Monitoring may be "counterproductive or not cost effective" for some jobs (at p. 666). Contracting may entail a trade-off between "increasing production efficiency while reducing risk-bearing efficiency," and "when the parties find that they cannot achieve both efficiency in production and efficiency in risk bearing, they choose a contract that attains neither" (at pp. 658, 664).

189. Intuitive also faces a principal-agent problem with healthcare providers such as the Plaintiffs. After entering into the SLSA with Intuitive, certain healthcare providers may wish to reduce their costs by purchasing reset instruments from third parties, without Intuitive's approval, to increase hospital profits.[443] However, healthcare providers do not internalize how the increase in patient risk from the resets would negatively impact Intuitive's reputation with the medical community, regulators, and patients in the case of an adverse event. The contractual agreements in Intuitive's SLSA explicitly address this agency problem.

190. Professor Elhauge claims that there is no principal-agent problem between Intuitive and third-party companies or Intuitive and hospitals and surgeons because, like Intuitive, third-parties and healthcare providers face "powerful reputation and liability incentives to avoid faulty EndoWrists and da Vinci robots."[444] However, such an assertion fails to note the differences in economic incentives that can and do exist between Intuitive, hospitals, and surgeons—which one would expect given that they have distinct roles in the healthcare sector—as well as the evidence that highlights such differences as discussed in more detail below.

191. Regarding third-party companies, Professor Elhauge asserts that "any reputational harm and liability risk for any resulting faults in equipment" would be borne by those companies rather than Intuitive.[445] Moreover, Professor Elhauge claims that this would lessen the "reputational and liability risk" to Intuitive because there would be an "increase [in the] odds that any reputational harm and liability risk for any resulting faults in equipment would fall on those rivals rather than

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[443] Larkin Community Hospital has reached out to third party companies such as Revanix for instrument resets due to cost-saving reasons. *See*, Gonzalez 30(b)(1) (10/17/2022) Dep. Tr. 14:10-21 ("Q. Okay. Were you involved in discussions with any vendors about the EndoWrist instruments? A. Yes. There were discussions about the instruments. Q. Okay. What were the discussions that Larkin had about – with respect to vendors other than Intuitive about the EndoWrist instruments? A. There was the – the instruments – upon getting Lab Number 10, it was no longer usable, and there was conversations with Revanix to the possibility of resetting the counter and that, therefore, lowered the cost of the procedure.").

[444] Elhauge Report, ¶ 385.

[445] Elhauge Report, ¶ 385.

on Intuitive."[446] However, Professor Elhauge provides no evidence that faults would be ascribed to third-party companies and/or third-party companies would assume responsibility. To the contrary, evidence indicates that, when faced with a potential failure of a reset EndoWrist, Rebotix—which supplied SIS and Restore—attributed the incident to "sabotage" by Intuitive.[447]

a. Although hospitals and surgeons share Intuitive's goal of protecting the safety of patients, evidence indicates that their incentives are not entirely aligned with Intuitive or with one another.

   i. For Intuitive, the da Vinci Surgical System is existential—it has been and continues to be Intuitive's primary product in surgical solutions.[448] For hospitals and surgeons, the da Vinci Surgical System is an option for performing surgeries, which I discussed in Section IV above.[449] Hence, although all parties seek positive outcomes for patients, the importance that the parties place on protecting the reputation of the da Vinci Surgical System likely varies.

   ii. Hospital administrators and surgeons may differ in incentives on certain issues as well. Surgeon testimony indicates that surgeons may be reluctant to use EndoWrist instruments that have not been cleared by the FDA or contradict the specifications set by the OEM. Dr. Francis at Franciscan stated that he would not be willing to "use an EndoWrist with a circumvented use counter on a patient" because going beyond the "normal number of uses" for the instrument "does not guarantee or in any way imply the instrument will

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[446] Elhauge Report, ¶ 385.

[447] In a draft distributor agreement between Rebotix and SIS, Rebotix included an explicit clause stating that it is "not liable for any direct, consequential, indirect, incidental or special damages, losses or expenses whatsoever arising: (a) in connection with, or due to the use of, or lack of ability to use, any Component or Repaired Wrist; or any delay in delivery of Repaired Wrist from [SIS]." SIS119300 ("Service Center Agreement") at -302 and SIS119299 (for the agreement's cover email, which is dated August 22, 2019). *See also* fn. 208.

[448] *See*, e.g., Section III.B above.

[449] *See*, e.g., Section IV.D above.

continue to work as designed."[450] Similarly, Dr. Estape, at Larkin expressed reluctance to operate with instruments that are not cleared by the FDA: "It would surely improve the cost efficiency of doing the instruments by letting [the number of uses] go longer, but I'm not willing to do something that's not FDA approved because, you know, anything that happens to the patient, they're going to come down on me for having used equipment that was not FDA approved at that time."[451]

192. Many of Professor Elhauge's points supporting his claim regarding "patient safety/product quality" rest on the premise that third-party EndoWrist resets are safe or as safe as Intuitive's new EndoWrist instruments.[452] Professor Elhauge relies on the expert testimony of Ms. Kim Trautman,[453] an Intuitive presentation of its own refurbishment program (known as "Project Dragon") that was never launched, and evidence from three hospitals—Pullman Regional Hospital, Conway Regional Medical Center, and Crescent City Surgical—that engaged with

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[450] Francis (10/14/2022) 23:22-24:23 ("Q. Would you be willing to use an EndoWrist with a circumvented use counter on a patient? …A. No. Q. Why not? A. From what I understand, the number on a repeated use instrument is placed there within a recommendation based on somebody, whether it was the engineers or elsewhere, that stated that was a normal number of uses that would basically give you normal use of the instrument. To go beyond that does not guarantee or in any way imply the instrument will continue to work as designed. And for one, I do not -- I do not like inefficiency. So to have to switch out an instrument that's malfunctioning or not working properly or slowing me down in some way really grates at my performance of operations. Q. If Franciscan were to tell you that its hospitals would be stocking EndoWrists that had reset use counters, how would you react? …A. I -- I would ask specifically if Intuitive had okayed this and what their engineers were saying about it because they're the ones who designed the instrument to begin with.").

[451] Estape (10/22/2022) 59:8-22 ("Q. Would you be willing to use an instrument from a company that has wiped the uses from an EndoWrist? A. You know, I would have to have a long discussion with the company to see if this is allowed, to see how they're going to get around doing that. It just doesn't seem -- I mean, if -- I would have to leave that at a much higher level where I'm at. It would surely improve the cost efficiency of doing the instruments by letting it go longer, but I'm not willing to do something that's not FDA approved because, you know, anything that happens to the patient, they're going to come down on me for having used equipment that was not FDA approved at that time.").

[452] Elhauge Report, ¶¶ 380-382.

[453] I understand that Dr. Howe will respond to Ms. Trautman's opinions.

Rebotix and Restore to purchase EndoWrist resets.[454] Neither Intuitive's Project Dragon nor evidence from the three hospitals establishes that the third-party EndoWrist resets are "safe":

a. Regarding Project Dragon, Professor Elhauge fails to discuss the differences between Intuitive's proposed refurbishment program and the third-party resets. For example, Intuitive's assessment of "[Instrument] Refurbishment Feasibility" contemplated that Intuitive would replace significant portions of the instruments (including the cables, inputs and flush tube) to "survive [additional] lives."[455] Rebotix, on the other hand, does not replace any instrument components.[456] In fact, Project Dragon did not launch because, after extensive research and testing into the feasibility of such a program, Intuitive found that the refurbishment program would be "cost prohibitive" relative to manufacturing new EndoWrist instruments.[457]

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[454] Elhauge Report, ¶ 380.

[455] *See* Intuitive-00367019 at -052. Intuitive's assessment provided that between 32-72 percent of instrument components would have been "scrap[ped]." (*Id*. at -056.). *See also* Goodson 30(b)(6) (11/16/2022) Dep. Tr. 40:7-12 ("Q. What is your understanding of refurbishment within the context of Project Dragon? A. Within the context of Project Dragon, refurbishment is the replacement of worn components on an expired Xi instrument to return to like-new performance.") and Nixon (10/17/2022) Dep. Tr. 110:4-14 ("Q. Do you have any understanding as to why [Intuitive did not implement a program to offer remanufactured instruments]? A. It was -- it was deeply assessed to ensure that the instruments would have the same quality performance and safety profile as the original ones that were coming off the line. And in order to do that, there were so many components that needed to be replaced in the device that had potential, you know, wear and tear that the overall cost of deconstructing the instrument and rebuilding it to initial full device was more expensive than the new instrument.").

[456] *See* REBOTIX162404 (Rebotix EndoWrist Service Procedure). *See also,* Papit (in *Rebotix*) Dep. Tr. Exhibit 7 at -471.

[457] Morales 30(b)(1) (11/9/2022) Dep. Tr. 172:23-173:20. ("A. I think project Dragon was a program or initiative to explore the feasibility of being able to perform refurbishment on instruments…At the end of the day when this whole thing was said and done, it didn't make sense, and – and it didn't make sense for a lot of reasons, and the – the – the biggest challenge here was the – all of the logistic work that was required in order to obtain an instrument, bring it back, ensure it was properly sterilized, disassemble, reassemble, repackage, and go through all that. And so, you know, what in – what Intuitive was doing, and – and what other companies were doing were different and, again, at the end of the day, it didn't make sense, it didn't make financial sense, it didn't make, you know, performance

b. Evidence from the hospitals does not demonstrate the safety of the reset EndoWrist instruments. First, neither the hospitals nor third-party companies have Intuitive's proprietary specifications; therefore, none of these parties are able to determine whether the reset EndoWrists meet the Intuitive's specifications, which were cleared by the FDA.[458] Second, although these hospitals claim that "[t]here was no difference than the non-reprocessed instruments," the basis of their statements appear to be confined to, for example, a few trials at their facilities and the representations of the third-party companies.[459]

1. Healthcare providers, surgeons, and patients benefit from Intuitive's best product and likely outcomes

193. As I discuss in more detail below, evidence shows that hospitals, patients, and surgeons rely on Intuitive to ensure that the da Vinci Surgical System will perform at high safety and technical standards, and Intuitive has invested in building this trust with its customers and the medical community.

194. Plaintiffs and Professor Elhauge appear to agree that the clinical benefits of da Vinci surgeries increase quality of care and makes the hospital more attractive to both patients and surgeons. As examples, Professor Elhauge notes that having a da Vinci Surgical System "create[s] a 'halo effect' that attracts patients (and revenue) for other procedures"[460] and that "[h]aving a surgical robot provides important marketing benefits to hospitals."[461] In addition, as described in the Elhauge Report, hospitals are better able to recruit and retain surgeons because—among other

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sense, and – and so the project didn't launch."); Goodson 30(b)(1) (10/27/2022) Dep. Tr. 73:9-13 ("The requirement for demonstrating the reliability of the instruments repeatedly over life and the cost associated with replacing the parts to achieve that reliability and building a business became cost prohibitive for pursuing the project.") and 74:7-10 ("Refurbishment of the Xi instruments to replace components or return it to like new resulted in a cost that would be greater than a new instrument.").

458 DeSantis (in *Rebotix*) Dep. Tr. 244:5-7 ("A. …our specifications and our requirements are our intellectual property of the company which we've not released.").

459 Harrich (5/24/2021) Dep. Tr. 37:1-24.

460 Elhauge Report, ¶ 80.

461 Elhauge Report, ¶ 81.

reasons—surgeons "may prefer the features and capabilities of MIST surgery robots" such as "being better able to perform complex surgeries" and "improved ergonomics that can extend a surgeon's career."[462]

195. Evidence indicates that surgeons depend on Intuitive to ensure that the da Vinci Surgical System will perform with the precision necessary for successful procedures. Surgeons have expectations over the "performance characteristics" of the surgical instruments that they use.[463] Examples of such characteristics in an EndoWrist instrument include "motion fidelity," "sharpness of the blades," "strength of holding a needle," and "alignment… between the jaws."[464] If the instrument is not performing to the surgeon's expectations, the surgeon would need to replace the instrument during the procedure and return the potentially defective instrument to Intuitive.[465] Intuitive has testified to its "commitment to the quality and to patient safety"[466] and that surgeons can trust the safety of the instrument because of Intuitive's rigorous testing.[467] Indeed, based on

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[462] Elhauge Report, ¶¶ 86-90.

[463] Rosa (in *Restore*) Dep. Tr. 55:1-4 ("A. …there are a set of performance characteristics and expectations a surgeon has of any instrument they use.").

[464] Rosa (in *Restore*) Dep. Tr. 49:21-50:4 ("A. …So this would be things, for example, motion fidelity, so how well is it -- is it moving, sharpness of blades, strength of holding a needle. Q. Alignment? A. Alignment could be another one between the jaws, yes.").

[465] Rosa (in *Restore*) Dep. Tr. 51:1-11 ("So for alignment of the jaws, if you're asking -- so as the surgeon is using an instrument and they say these jaws are out of alignment, so they'll -- and it's not meeting their needs in surgery or whatever the need may be at the time, grasping of tissue, you know, holding of a needle, whatever that is. The instrument will come out. We expect it to come back to us so that we can analyze it and figure out why the jaws may have gotten out of alignment.") and 55:4-10 ("A. …If that instrument is meeting those needs of the particular surgery, they'll move on with it. If it's not, what I -- what I would hope they do is they pull it out, put in another one, and continue the operation so they -- you know, to the -- and keep it up expeditiously for the patient.").

[466] Rosa (in *Restore*) Dep. Tr. 47:3-10 ("A. How do they know that it meets the specifications? Like that -- I mean, if I understand, that's our commitment to the quality and to patient safety. It's what we're supposed to do as a company. During use they may see something that says, hey, this isn't meeting what I expect. And that's when we should see a return.").

[467] Rosa (in *Restore*) Dep. Tr. 48:18-49:8 ("Q. So how does the surgeon know that the instrument is safe to use after that first use? A. I think it -- I think it goes back to we've committed within our testing and with our labeling to a certain number of uses. And that all of our testing internally shows that the -- both the characteristics of use, sharpness, the

market research surveys conducted by Intuitive, feedback from surgeons generally has been positive on the quality and reliability of the product.[468]

196. Contrary to Professor Elhauge's claims,[469] there is ample evidence of safety concerns relating to third-party "servicing" of da Vinci components. Surgeon testimony from several of the Named Plaintiff's hospitals indicates their discomfort with using EndoWrist instruments that have had their use counters circumvented. For example, Dr. Francis, who was chief of surgery at Franciscan between 2010 and 2020,[470] and Dr. Maun, another surgeon at Franciscan, stated that they would not use an EndoWrist with a circumvented use counter.[471] Dr. Estape echoed these concerns, stating, "I would want to make sure that we're doing things appropriately and we don't have expired -- anything we use in the operating room."[472] When discussing a meeting he had

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fidelity of motion, the things the surgeon can see will meet their expectations for surgical performance. And then all of the factors that the surgeon can't see also will meet the safety specifications that we've established.").

468 *See,* e.g., Intuitive-00578133 at -141 and -155. In a survey of da Vinci Xi users, 82 percent of respondents gave a 9 or a 10 out of 10 in response to the question "how likely are you to recommend the da Vinci Xi system to a colleague?" In addition, 79 percent of respondents rated da Vinci Xi instruments "Much Better" than "other minimally invasive surgical instruments" they use.

469 Elhauge Report, ¶¶ 294-300.

470 Francis (10/14/2022) Dep. Tr. 6:21-23 ("Q. Okay. Am I correct that you were the chief of surgery for Franciscan from 2010 to 2020? A. That's correct.").

471 Francis (10/14/2022) Dep. Tr. 23:22-25 ("Q. Would you be willing to use an EndoWrist with a circumvented use counter on a patient? …A. No."). *See also* Maun (11/8/2022) Dep. Tr. 27:7-12 ("Q. Would you be comfortable with using an EndoWrist with a circumvented use counter? A. I probably would not use that. Q. Why not? A. Because then I don't know the history of the number.")

472 Estape (10/22/2022) Dep. Tr. 60:10-61:1 ("Q. To your knowledge, have you ever used an EndoWrist that has been reset? A. Not to my knowledge. Q. Is that something you would want to know before you performed a surgery? A. Oh, absolutely. Q. Why? A. Well, because these things are cleared only for a certain number of procedures, and so I would want to make sure that we're doing things appropriately and we don't have expired -- anything we use in the operating room, everything that they check, the nurses open, there's an expiration date, there's a usage date, there's all these things. And so if we're doing something off label, I surely want to know about it, and I probably wouldn't participate in it.").

with a third-party company offering to reset instruments, Dr. Estape described the program as "shady."[473]

197. Intuitive, on the other hand, has demonstrated a long-standing commitment to ensuring that the da Vinci Surgical Systemis safe and reliable, and performs as expected. For example, to this end, Intuitive performed extensive safety testing before setting their initial use count limits and then performed additional testing before increasing the use count limits as part of their Xi extended use instruments.[474] The results of Intuitive's testing stand at odds with Professor Elhauge's assertion that Intuitive set its use limits "arbitrarily low."[475] In fact, during its extended use life testing, Intuitive subjected samples of each Xi instrument model to as many as 22 simulated surgical uses (SSU).[476] In every case, a subset of the sample tested to failure before reaching the

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[473] Estape (10/22/2022) Dep. Tr. 57:18-58:7 ("Q. What do you remember about the meeting? A. Well, a company comes in and says that it can wipe out the number of uses on an instrument that's FDA cleared for only ten uses, I thought that was a pretty interesting meeting. Q. Why was it interesting to you? A. Well, you know, everything that we do in medicine is for safety, you know, and certain things are cleared only by the FDA, and it just seemed like a -- for – I'll just use the word shady, a very shady meeting where, you know, oh, I can take this and I can wipe off the uses for this instrument and you can keep using it forever. It just didn't seem -- you know, it didn't seem like a very up-and-up program. I've never heard of that before.").

[474] Intuitive-00004692 at -692 ("To analyze the ability of instrument lives to be extended safely, life testing was performed on X/Xi instruments and a cumulative risk analysis was completed and summarized. Life testing that was used previously to validate the specification of 10 lives (for most instruments) was completed 'to failure' to determine the maximum allowable number of lives for each instrument, utilizing knowledge gained from years of instrument usage.").

[475] Elhauge Report, ¶ 340.

[476] Intuitive-00552535. Note that in addition to the use lives tested, Intuitive also tested additional reprocessing cycles to account for additional sterilization cycles that occur when an instrument enters the surgical field, but does not end up being used. *See also* Intuitive-00004692 at -699-700 ("Number of uses can be different from the number of reprocessing cycles when an instrument is brought into a sterile field, but is not put on the system and used by the surgeon. The instrument would still need to be reprocessed because it became contaminated by the surgical field, but, since the system-instrument interaction is what deducts the number of instrument lives, the number of uses remaining would remain unchanged. Current reliability testing accounts for these additional reprocessing cycles by testing to 5 additional reprocessing cycles to the Weibull analysis.").

maximum number of cycles for testing (which ranged from 14 to 22 SSUs).[477] For example, of the 22 Xi long tip forceps tested, 5 tested to failure by the 21st SSU. Based on these results, Intuitive approved this Xi instrument for 18 uses.[478] Far from "arbitrary," evidence shows that the reliability and confidence standards Intuitive uses for a given test case reflect the clinical risks associated with the function being tested.[479] Surgeons rely on this kind of safety testing to ensure that the instruments "work as designed" during surgery,[480] and they trust Intuitive to do it.[481]

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[477] Intuitive-00552535. *See also* Intuitive-00029837 at -840 for definition of "simulated surgical use".

[478] *Id.*

[479] Intuitive-00004692 at -702 ("Life testing protocols and reports trace to reliability requirements for instruments. The reliability and confidence levels of the life testing test cases vary depending on risk levels associated with different clinical risks and different failure modes."). *See also* Intuitive-00552533; Nixon (10/7/2022) Dep. Tr. 31:23-32:11 ("Q. And what's your general understanding of how those use limits were set? A. So for each of the instruments, there is an instrument architecture associated with it. There is a -- control parameters, how the instrument is driven, and a clinical use scenario that goes with each of the instruments, because they complete different surgical tasks. And so the combination of those three things were assessed to determine how we can ensure kind of consistent safety and efficacy of the instrument over the course of the lives of the instrument. And those came together to determine the lifes [sic] that came on the instrument.").

[480] Francis (10/14/2022) Dep. Tr. 23:22-24:15 ("Q. Would you be willing to use an EndoWrist with a circumvented use counter on a patient? … A. No. … Q. Why not? A. From what I understand, the number on a repeated use instrument is placed there within a recommendation based on somebody, whether it was the engineers or elsewhere, that stated that was a normal number of uses that would basically give you normal use of the instrument. To go beyond that does not guarantee or in any way imply the instrument will continue to work as designed. And for one, I do not -- I do not like inefficiency. So to have to switch out an instrument that's malfunctioning or not working properly or slowing me down in some way really grates at my performance of operations.").

[481] *See,* e.g., Francis (10/14/2022) Dep. Tr. 24:16-23 ("Q. If Franciscan were to tell you that its hospitals would be stocking EndoWrists that had reset use counters, how would you react? … A. I -- I would ask specifically if Intuitive had okayed this and what their engineers were saying about it because they're the ones who designed the instrument to begin with."). *See also* Rosa (in *Restore*) Dep. Tr. 47:3-7 ("A. How do [surgeons] know that [the EndoWrist instrument] meets the specifications? Like that -- I mean, if I understand, that's our commitment to the quality and to patient safety. It's what we're supposed to do as a company.") and 48:18-49:8 ("Q. So how does the surgeon know that the instrument is safe to

198. Intuitive's methods and the da Vinci Surgical System also have been proven safe and reliable in the field. Since 2012, nearly 6.6 million da Vinci surgeries have been performed in the U.S. by more than 32,000 surgeons.[482] From 2018 to 2021, 4,543 surgeons, performing at least 5 surgeries every quarter, performed over 1.91 million surgeries.[483]

199. Evidence indicates that patients often rely on healthcare professionals for information about treatment choice. For example, in a 2018 survey of 420 patients in the U.S. with benign and malignant diagnoses, Intuitive found that 46 percent of patients replied that healthcare professionals are "the most useful source of information," followed by the internet at 25 percent of respondents.[484] In addition to the hands-on experience that surgeons, patients, and healthcare providers get through performing or undergoing a da Vinci surgery, Intuitive has invested in developing trust with the medical community. For example, Intuitive has numerous training initiatives and resources for surgeons and care teams to "[support] their safe and effective use of our tools and technologies to help the patients they serve."[485]

2. Third-party companies potentially put patient safety and Intuitive's reputation at risk

200. Economic theory predicts that, as a third-party company does not incur the costs of investments in designing or developing the da Vinci Surgical System and that bears (at most) a fraction of the repercussion of adverse surgical outcomes, they do not have the same incentives as Intuitive to protect patient safety and therefore is more likely to put patient safety at risk.[486] That third-party

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use after that first use? A. I think it -- I think it goes back to we've committed within our testing and with our labeling to a certain number of uses. And that all of our testing internally shows that the -- both the characteristics of use, sharpness, the fidelity of motion, the things the surgeon can see will meet their expectations for surgical performance. And then all of the factors that the surgeon can't see also will meet the safety specifications that we've established.").

482 Intuitive-00706097. *See* Procedures Data Calculation.do.

483 *Id.*

484 Intuitive-00122488 ("Summer Internship – Patient Information Journey, Summer 2018") at -504.

485 Intuitive 2020 Sustainability Report at pp. 13-15.

486 *See* ¶ 187 above on the principal-agent problem.

companies do not have the same incentives to protect Intuitive's reputation and financial viability is indicated by these companies' business practices. For example, as explained below:

a. These companies perform resets without knowledge of Intuitive's proprietary specifications of the da Vinci Surgical System. Hence, not only are these companies unable to ensure that the EndoWrist reset meets the OEM's specifications, the third-party companies do not have access to the complete specification of the system to be able to assess whether the reset would have other ramifications.

b. Evidence indicates that the third-party companies' representations of their safety testing protocols of the EndoWrist reset process are misleading.

201. Third-parties do not have Intuitive's proprietary specifications and thus lack the means to ensure compliance with those specifications. Key personnel at Rebotix, Restore, and SIS have stated that they do not have access to Intuitive's proprietary specifications.[487] Both Restore and SIS relied on Rebotix's representations of EndoWrist instrument testing.[488] Without Intuitive's

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[487] *See*, e.g., Hamilton (in *Rebotix*) Dep. Tr. 110:18-21 ("Q. Do you agree that at no time did Rebotix or Rebotix Panama have a complete set of the factory specifications for the EndoWrist instruments? A. Yes."); May (in *Restore*) (5/6/2021) Dep. Tr. 81:9-25 ("Q. Have you ever had the complete engineering specifications for any da Vinci robotic surgery instrument? A. No. Q. Have you ever seen the complete specifications for a da Vinci robotic surgery instrument? A. No. Q. Have you ever attempted to obtain complete specifications for any da Vinci robotic surgery instruments? A. Yeah, we searched on the internet to see if we could find manufacturer-published specification, and let me correct myself from a previous comment. Intuitive Surgical does provide in their literature certain specifications for their devices, and that is public knowledge."); Posdal 30(b)(6) (11/1/2022) 57:13-19 ("Has SIS ever had access to the -- to Intuitive's original specifications for EndoWrist instruments? A. No. Q. And has SIS ever had access to Intuitive's design history files for EndoWrist instruments? A. No."). *See also* DeSantis (in *Rebotix*) Dep. Tr. 244:5-11 ("A. …our specifications and our requirements are our intellectual property of the company which we've not released. So I don't know how a third party would be able to ensure and guarantee that their quality system – that they were developing to our specs, that their quality system was sufficient and on par with us, et cetera, et cetera.").

[488] May (in *Restore*) (5/6/2021) Dep. Tr. 138:7-138:17 ("Q. So there was a testing program at your companies in 2018 and 2019; is that right? A. No, that's what Rebotix did. Rebotix did that -- Rebotix did that testing and provided the information to us when they did the training when we started to do the service. Q. So Rebotix did some testing and Rebotix formulated a

specifications, neither Rebotix, Restore, nor SIS was in a position to claim that the reset EndoWrist instruments met the OEM's specifications, which have been cleared by the FDA.

202. In addition, evidence reflects that third-party repair companies' representations of safety testing are misleading and inadequate. With regard to EndoWrist resets, Rebotix and SIS claim that "[t]he repair of da Vinci EndoWrists does not alter the intended use, method of use, functionality or performance of the [EndoWrist] in any way."[489] Similarly, Restore's marketing materials state that "There are no changes to the performance or safety specifications of the instrument."[490] Testimony from SIS and Restore reveal that neither company performed its own testing and relied on the "testing" represented by Rebotix.[491] However, despite its claim that it can "reset the

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set of specifications based on the testing that they said they did? Is that how it worked? A. That's correct."); Posdal 30(b)(6) (11/1/2022) Dep. Tr. 66:17-67:7 ("Q. Let's look, now, at the fourth bullet. In the third sentence of that bullet it states: 'The repaired device will function identically to the new OEM EndoWrist.' Do you see that statement? A. I do. Q. Okay. What did SIS do to confirm the accuracy of that statement? A. Nothing more than rely on Rebotix and their testing and process and procedures. Q. Okay. So SIS did not do anything to confirm that it was accurate that the repaired device will function identically to the new OEM EndoWrist; correct? …[A.] Correct.").

489 REBOTIX053277_001; SIS095124 at -124.

490 Restore-00022922 at -924.

491 [redacted]

counter an unlimited number of times," Rebotix personnel testified that the company had only "validated testing up to 29 times" for the number of uses.[492] Similarly, Restore advertised that its "[Preventative Maintenance-Only] Program provides the confidence and certainty of knowing that the surgical robot remains within 'spec.'"[493] As discussed above, Restore lacked Intuitive's specifications and instead relies on its field engineers who were former Intuitive technicians.[494]

203. During the brief period in which Restore and Rebotix performed da Vinci System "servicing" and EndoWrist resets, evidence shows that Restore and Rebotix demonstrated substandard work and failed to take responsibility for their mistakes. In one instance, an Intuitive technician who had been called to service a da Vinci platform found the device in a state of disrepair with unplugged cables and cords left by the Restore technician who had "serviced" the machine

[redacted]

492 Gibson (in *Rebotix*) Dep. Tr. 65:6-14 ("Q. Did you ever tell any customers how many times they could expect to be able to reset the usage counter on an EndoWrist? A. I think we told them exactly what I said, that we can reset the counter an unlimited number of times, but not all EndoWrists will be available for the repair process because some of them will be so badly damaged or something else is wrong with them where they will not be a candidate for the repair service."); Papit (in *Rebotix*) Dep. Tr. 74:15-22 ("Q. …When the Interceptor is used on an EndoWrist, how many additional times can that EndoWrist be used over and above the usage limit that was set by Intuitive? A. We have validated testing up to 29 times. We have not done past 20 in our brief presence in the marketplace due to interference that precedes this discussion.").

493 Parker (in *Restore*) Dep. Ex. 3 at -525.

494 May (in *Restore*) (5/6/2021) Dep. Tr. 177:19-24 ("Q. How could you advertise that this preventive maintenance program would keep the robot within spec when you didn't know what the specifications were? A. We relied upon our technicians that were certified technicians by Intuitive Surgical.").

Bruce McDaniel and West Gordon were former Intuitive employees and employees of Restore (Parker (in *Restore*) Dep. Tr. 91:6-92:9). Mr. Gordon's employment with Intuitive ended in 2014 after he "got into an altercation and had a black eye from it" while on a trip paid by Intuitive (Gordon (in *Restore*) 82:19-83:25). He joined Restore approximately five years later in "January or February of 2019" (Parker (in *Restore*) Dep. Tr. 91:18-20). Mr. McDaniel joined Restore in January 2019 and was "fired" by Clif Parker in March or April 2019 (Parker (in *Restore*) Dep. Tr. 92:7-9; Vautrot (in *Restore*) Dep. Tr. 201:3-25).

before him.[495] According to the Intuitive technician, the mistake "would have deeply impacted the next procedure in a negative way"[496] and a trained Intuitive field service engineer would not have left the machine in that state.[497] On other occasions, Restore was simply unable to perform service without Intuitive's proprietary service laptops.[498] In an email with Joey Abney of Ardent Health Services, Sandy Morford of Renovo referred to Restore's service as "very low-end," and advised against relying on their service for da Vinci Systems.[499] In response to reports that a reset EndoWrist had failed, Rebotix and Restore claimed "intentionally inflicted damage" and "sabotage," respectively.[500] The evidence of substandard work performed by Restore and the failure of both Restore and Rebotix to accept responsibility for device failures is consistent with third-party companies having lesser incentives to maintain quality and safety standards than does Intuitive as the original manufacturer.

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[495] Gamiddo (in *Restore*) Dep. Tr. 28:22-29:23. *See also* BSWH-0000255 and BSWH-0000221.

[496] BSWH-0000255 at -256 ("Luckily I happened to be here to discover this issue; however if I wasn't here then this would have deeply impacted the next procedure in a negative way. These cables should never be unplugged, and there is no maintenance situation where we would unplug cables and leave the system in an error state.").

[497] Gamiddo (in *Restore*) Dep. Tr. 31:10-22 ("Q. And a trained Intuitive field service engineer would not have even unplugged the power cord or the communication cable as part of preventive maintenance; is that right? … A. That's correct. … Q. And a -- and a trained Intuitive field service engineer would not have completed preventive maintenance on the da Vinci surgical system by leaving the system in an error state; is that right? A. That's correct.").

[498] *See,* e.g., AHS_MGMT000025. *See also* BSWH-0000221 at -223 ("There was no software access for any PM tests which required Software access to complete appropriate tests. Unable to Complete Software Driven tests."). Testimony of West Gordon, a field engineer for Restore confirms that he was unable to guarantee that the da Vinci robots he serviced would work as expected without the software. Gordon (in *Restore*) Dep. Tr. 118:1-9 ("A. …I told them there was no way for me to guarantee that there was nothing more wrong with it. Q. Why was there no way for you to guarantee that was -- there wasn't anything more wrong with it? A. Because I was -- I did not have MATLAB, and there was no way for me to run those tests that should be run on it.") and 272:17-24 ("A. …I would tell them that all my testing, test driving it, putting it in every position possible, driving it as hard as I can, I mean, that there was no way for me to reproduce the issue, and so, therefore, there was no way for me to be able to validate either way without…software.").

[499] Renovo-IS000001 at -009.

[500] *See* REBOTIX046346 and Restore-00003932.

204. When the increase in risk to patient safety is accounted for, third-party companies' purported cost savings are much lower than they market to Intuitive's customers. As an example, I focus on reset ProGrasp Forceps EndoWrist instruments sold by SIS. These instruments comprised 11.7 percent of SIS's EndoWrist reset sales.[501] On a per use basis, a new ProGrasp Forceps from Intuitive would be $220 whereas a reset instrument from SIS would be $130.[502] The healthcare provider "saves" $90 per use with SIS's reset instrument over Intuitive's new instrument. Internal testing by Intuitive demonstrates that EndoWrist instruments have a limited number of reliable uses.[503] Furthermore, I understand that gradual degradation over time is one of the risks identified through Intuitive's risk analyses and life testing, which is factored into the established use limits.[504] Hence, evidence indicates that the healthcare provider effectively trades off $90 in

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[501] Smith Counterclaims Damages Report at Table 1. 0.117 = $6,500 in [C][4] / $55,700 in [C][15].

[502] REBOTIX001387 at -394 and SIS010647. This calculation does not account for the fact that, for its initial EndoWrist reset with SIS, the customer needs to send the EndoWrist with one remaining use. *See* Posdal 30(b)(6) (11/1/2022) Dep. Tr. 40:6–10 ("Q. So the -- the first time that SIS facilitates a -- a reset, the instrument needs to have at least one use remaining on it; is that right? A. That is correct.").

[503] DeSantis (in *Rebotix*) Dep. Tr. 132:14-24 ("Q. Well, when you're submitting documentation about an EndoWrist to the FDA, you include a proposed number of lives for that instrument; right? A. Yes. Q. And then some documentation that supports that number of lives for the instrument; right? A. Yes. We -- we provide them with the specifications for the instrument, including number of lives. And then we have to prove that we're sure it will work for those number of lives, and -- and they ask for that data.") and 169:6-17 ("A. …The life -- the life rating was based on whatever we can get out of [the extended life instruments]. We tested them, you know, to the point where we can statistically indicate them. That's why we ended up with, in my opinion, a sub-optimal stratification: Sum 12, sum 14, sum 18. It was the most we can get out of them at our statistical testing for our specifications and requirements. That has nothing to do with the financials. It was after we determined the number of lives that we can confidently statistically claim, then how do we price them.").

For example, Intuitive conducted additional testing before offering extended use instruments whose use counters were set beyond 10 uses. For the Forceps EndoWrist instrument mentioned above, Intuitive tested 22 instruments. Of these, three tested to failure in 22 or fewer use cycles. After this testing, Intuitive raised its use count limits from 10 to 18. *See* Intuitive-00004692; Intuitive-00552535.

[504] I understand that Dr. Howe has concluded that gradual degradation of an instrument was one of the risks identified by Intuitive and factored into Intuitive's risk analyses and life testing (Howe Report ¶ 73). I also understand that Dr. Howe opined that he would expect Rebotix's

"savings" for an increase in the probability of instrument failure. Third party "savings" potentially come at the cost of a safe and successful da Vinci surgery to the patient, which is an expected cost that I have not seen them consider or communicate to customers or patients.[505]

205. Intuitive's conduct—particularly in light of third-party resets of Si EndoWrist instruments—has been consistent with a manufacturer concerned with patient safety as opposed to a monopolist, as Professor Elhauge alleges.[506] For example, in 2020, Intuitive rolled out its Extended Use Program in which it increased use limits by varying amounts for 13 Xi EndoWrist instruments, and the cost per use for these instruments decreased, rather than increased.[507] Indeed, evidence indicates that competition with traditional laparoscopy, including for benign procedures in the U.S., was a key objective of Intuitive's Extended Use Program.[508] Evidence also shows that the variation in use limits, which ranges from 12 to 18 uses, is based on extensive testing by

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reset efforts—and the use of EndoWrist instruments beyond the limits prescribed by Intuitive—would increase instrument failure rates due to increased wear and tear (Howe Report ¶¶ 75-76). *See generally* Howe Report § V; *see also id.* at ¶¶ 109-113 for an explanation of the correlation between increased instrument usage and instrument problems demonstrated in Rebotix's own analyses.

505 Dr. Estape noted the liability and financial risk of operating with an instrument that had not been cleared by the FDA; he did not quantify such a risk in his testimony. *See* fn. 451 above.

506 For example, Professor Elhauge claims that "[e]conomic theory tells us that lower competitive pressure allows firms to take actions which extract more profit, such as by raising prices or artificially lowering use limits." *See* Elhauge Report, ¶ 361.

507 Intuitive-00560028 at -034 and -038. *See also* "Da Vinci X/Xi Instrument & Accessory Catalog," October 2021, Intuitive Surgical, Inc., accessed January 6 2023, https://www.intuitive.com/en-us/-/media/ISI/Intuitive/Pdf/xi-x-ina-catalog-no-pricing-us-1052082.pdf. *See also* Intuitive-00004692 at -692.

508 Intuitive-00840257 at -069 ("Objective: Leverage the economic benefit of Extended life instruments to lower the barrier to adoption with a focus on targeted cost sensitive procedures."), -278 ("Intuitive's product offering is increasingly aligned with economic realities of my hospital, and allowing me to offer da Vinci as a first choice to a broader set of patients than before…Standardize instruments used in targeted procedures: benign surgery in U.S., malignant surgery in EU to bring per procedure costs closer to lap."), and -286 (comparison of Current I&A, Lap I&A, and Proposed I&A costs for cholecystectomy, inguinal hernia repair, and benign hysterectomy for the U.S.).

Intuitive.[509] This conduct is more consistent with a company that continues to try to find ways to compete in spaces historically occupied by other surgical modalities—e.g., traditional laparoscopy—as opposed to a company that is trying to extract monopoly rents, as Professor Elhauge claims.

3. Intuitive's reputation and future would be at risk if third parties were allowed to sell reset EndoWrist instruments

206. As discussed above, third-party companies do not have the same incentives as Intuitive to protect patient safety and the reputation of the da Vinci Surgical System.[510] This is reflected in the evidence showing the inadequacy of third parties' testing and knowledge about the components of the da Vinci Surgical System and the system as a whole discussed above. Risk to patient safety not only endangers the health of the patient, but also poses significant risk to Intuitive's reputation and future business.[511]

207. There are numerous ways in which adverse events to patients can harm Intuitive's reputation and future business. One way is that the FDA publicizes adverse events associated with medical devices in its MAUDE database, which is publicly accessible.[512] Another way is that adverse events, or the risk of adverse events, may lead to news or "safety communications" that could impact whether healthcare professionals recommend da Vinci surgery as a treatment option. For example, the FDA issued a "[s]afety [c]ommunication" on August 20, 2021 to warn patients and healthcare providers that the "safety and effectiveness of using robotically-assisted surgical (RAS) devices for use in mastectomy procedures or in the prevention or treatment of breast

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[509] *See* ¶ 197 above. In addition, Intuitive made changes to the design of the instrument to ensure that the extended use instrument would perform at Intuitive's quality standards; *see* fn. 552 below.

[510] See ¶ 187 and ¶¶ 200-203 above.

[511] Intuitive 2021 Form 10-K at p. 27 ("Our success depends on the quality and reliability of our products… Because our products are designed to be used to perform complex surgical procedures, due to the serious and costly consequences of product failure, we and our customers have an increased sensitivity to such defects.").

[512] See fn. 441 above.

cancer ha[s] not been established" nor has the FDA "evaluated the safety or effectiveness of RAS devices for the prevention or treatment of cancer, based on cancer-related outcomes."[513] This "high-profile publication and an FDA warning" may have deterred some surgeons from MIS radical hysterectomy in favor of open surgery.[514] These examples show how risks to patient safety can have significant consequences for Intuitive's business.

208. Evidence indicates that within a short period of time after identifying third-party resets, Intuitive usually expresses its concern that these resets can impact the safety of patients and the effectiveness to the system.[515] Indeed, I understand that Dr. Howe identified "8 instances of instrument failure following the extension of an EndoWrist's useful lives by Restore" and "at least 19 additional instrument failures following the extension of an EndoWrist's useful lives by Rebotix's installation of the Interceptor."[516]

209. Professor Elhauge claims that Intuitive's alleged misconduct restricts the choices available to surgeons and hospitals; in other words, but-for the allegedly exclusionary restraints, surgeons and hospitals could choose to use a new EndoWrist instrument or a reset EndoWrist instrument.[517] However, as I discussed above, the incentives of surgeons and hospitals can differ

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[513] "UPDATE: Caution with Robotically-Assisted Surgical Devices in Mastectomy: FDA Safety Communication," U.S. Food & Drug Administration, August 20, 2021, accessed January 6, 2023, https://www.fda.gov/medical-devices/safety-communications/update-caution-robotically-assisted-surgical-devices-mastectomy-fda-safety-communication.

[514] Krishnansu S. Tewari, "Minimally Invasive Surgery for Early-Stage Cervical Carcinoma: Interpreting the Laparoscopic Approach to Cervical Cancer Trial Results," *Journal of Clinical Oncology* 37, no. 33 (2019): 3079.

[515] For example, approximately a month after Conway Regional Medical Center ("Conway") first used a reset EndoWrist instrument, Intuitive sent a letter to Conway's operating room director that stated: "Continued use beyond this determined useful life, normal wear and tear may impact instrument performance. …Any of this degraded product performance could impact the procedure and result in unintended safety risks to the patient." *See* Intuitive-00288971 (on the timeline) and Intuitive-00288975 (Intuitive's letter to Conway).

[516] Howe Report, ¶ 79. *See also* Howe Report, ¶¶ 77-78 for descriptions about types of failures after instruments had their "useful lives extended by third parties such as Restore and Rebotix," and customer complaints.

[517] Elhauge Report, ¶ 346.

from those of Intuitive, particularly with respect to ensuring the perceived quality and reputation of the da Vinci Surgical System, and surgeon incentives and hospital incentives even can differ from one another.[518] In addition, Intuitive's specifications are proprietary and not available to the public such that surgeons and hospitals may not be fully aware of the risks entailed between the options.[519] Professor Elhauge hypothesizes that there are "less restrictive methods" to preserve safety and quality and offers as an example that Intuitive could "educat[e] hospitals on how to evaluate the condition of used or repaired EndoWrists or the quality of rival da Vinci servicing."[520] However, such "educational" initiatives impose financial and time costs on both Intuitive and hospitals that are not necessary under Intuitive's current business model. Moreover, educating numerous third parties on the proprietary specs of the da Vinci Surgical System could pose a serious risk to Intuitive of IP leakage, which would reduce Intuitive's incentives to innovate.

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[518] *See* ¶ 190 above.

[519] DeSantis (in *Rebotix*) Dep. Tr. 244:5-14 ("A. …our specifications and our requirements are our intellectual property of the company which we've not released. …That's really, you know, a lot of the investment that we've put …into the company to develop those specific type of things.").

As an example of uncertainty with regards to risk from the perspective of a surgeon, *see* Francis (10/14/2022) Dep. Tr. 21:20-22:19 ("Q. For an EndoWrist that was set for ten uses, if the use counter indicated that that tenth use had already happened but the device was working, would you feel comfortable with using that EndoWrist? …A. Would I feel comfortable? Yeah, that's more an emotional aspect. I would not feel comfortable with using an instrument that's not been rated as safe, if that's what we're using these numbers for. I -- I say that hesitantly because I was trained in engineering, and I know that there is a built-in safety window within every instrument. And so by definition, no matter what you do, you pick the -- you err on the side of safety where an instrument is less likely to fail. I have no idea because I was not part of the engineering work on these machines whether an instrument may work ten times or a thousand times before it failed, so I'm not privy to what that range of safety is. So when you say 'uncomfortable,' I have no basis to know whether they failed the twelfth time or the 1,200 time.").

[520] Elhauge Report, ¶ 383.

C. INTUITIVE'S SALE OF INTEGRATED SYSTEMS HAS FOSTERED PROCOMPETITIVE INNOVATIONS AND QUALITY IMPROVEMENTS

210. Intuitive continuously has innovated on the da Vinci Surgical System, including the da Vinci platform and instruments. Since 1998, the company has released four generations of da Vinci platforms.[521] Intuitive offers the "largest library of end effectors" among robotic assisted-surgical systems.[522] A customer survey conducted by Intuitive in 2017 indicates that customers consider Intuitive to be innovative and high quality.[523]

211. Integration of Intuitive's surgical system (or "bundling" the components of the da Vinci Surgical System) encourages Intuitive to pursue these innovations. There are several ways in which offering an integrated product, or bundling, preserves a company's incentives to continue innovating. First, as explained above, selling an integrated system mitigates risks to Intuitive's reputation, which could pose significant risk to the financial viability of an investment.[524] Second, bundling can help to ensure that components are compatible across the system and

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[521] *See* ¶ 28 above.

One example of an improvement from the third generation (Si) to fourth generation (Xi/X) is that the da Vinci Xi patient cart has a "gantry system to position the instrument manipulators directly overhead the operating table." In contrast, the "reachable workspace" of the da Vinci Si patient cart is "highly dependent on the orientation of the cart." *See* Azizian et al. at p. 10.

[522] Longmore et al. at p. 13. As examples of the introduction of new instruments, Intuitive obtained FDA clearance for its EndoWrist One Vessel Sealer in December 2011 and its EndoWrist Stapler 45 Instrument with Blue and Green 45 mm reloads in October 2012. *See* Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2014 ("Intuitive 2014 Form 10-K" at p. 7).

[523] Intuitive-00143279 ("2017 Global Customer Satisfaction Survey: United States") at -284 (Sixty-three percent of customers responded that they expected Intuitive Surgical to be "in a STRONGER position in five years," and the top volunteered reasons included: (i) innovation (64 percent); (ii) quality of products (42 percent); (iii) track record (42 percent), and (iv) training/education (42 percent)). *See also* -293 (80 percent of respondents felt that Intuitive "[h]as a strong track record of developing robotic-assisted surgical programs for hospitals" while 84 percent felt that Intuitive "[o]ffers high-quality products").

[524] As discussed above in, V.E.3, the riskiness of an investment influences the decision of whether to invest in the first place.

reduce costs associated with coordination across separate companies.[525] Third, bundling can reduce the risk that third parties will take advantage of Intuitive's IP without sharing in the cost (and entailed risk) of development.[526] As I next explain further, each of these factors likely influences Intuitive's decision to offer the da Vinci Surgical System as an integrated product.

212. First, allowing third-parties to reset EndoWrist instruments not only poses significant risks to the patient safety, reputation, and financial viability associated with Intuitive's existing surgical systems, it also may dampen Intuitive's incentives to continue investing in improvements to the da Vinci family of surgical systems.[527] That is, as a matter of basic economics, Intuitive's incentives to invest in new generations of da Vinci Surgical Systems depends on the returns it expects to make on those investments. And, to the extent that bad patient outcomes harm Intuitive's reputation with potential customers, current and/or expected future resets by third parties that increase the risk of bad patient outcomes may decrease Intuitive's expected returns on investments and thus dampen its incentives to invest.

213. Second, as previously discussed,[528] the da Vinci Surgical System was designed based on four "product pillars" that depend on various components of the system working together.[529] Compatibility of the technology is critical to the function of the da Vinci Surgical System. Many of the parts for the system are "specially designed for Intuitive," including parts for the da Vinci platform and the EndoWrist instruments.[530] Unbundling the parts would be potentially costly to

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[525] *See* ¶ 185.b above. Professor Tirole's arguments on tying would similarly apply to "bundling" in the context of the da Vinci Surgical System. As I understand, both the da Vinci platform and EndoWrist instruments are integral to the functioning of the system, and there is little distinction between tying and bundling when one good is "valueless" without the other (*see* Section III.B and fn. 432 above).

[526] *See* ¶ 185.d above.

[527] As I described in ¶¶ 189-190 above, healthcare providers likely also do not fully internalize the potential ramifications of their actions on Intuitive's reputation and financial viability.

[528] *See* ¶ 75 above.

[529] *See* ¶ 76 above.

[530] Rosa (in *Restore*) Dep. Tr. 15:23-19:17 (on the da Vinci Si platform) and 20:16-22:2 (on the da Vinci Xi platform); DeSantis (in *Rebotix*) Dep. Tr. 23:8-24:4 (on instruments, including EndoWrists). *See also* Robinson (in *Restore*) Dep. Tr. 14:18-22.

Intuitive, which would need to incur costs to accommodate parts that were not designed as part of system, and possibly to the healthcare provider, which would have to source the correct components.[531] The integrated system saves on these compatibility costs for Intuitive, increasing its incentives to invest in the development of the system.

214. Third, potential for a third party to take advantage of Intuitive's IP without sharing in the costs (and entailed risks) of development is another concern that may arise with an unbundled product. The third party is effectively "free riding" on the innovator's (here, Intuitive's) IP.[532] A "free rider" is defined as a "[c]onsumer or producer who does not pay for a nonexclusive good in the expectation that others will."[533] Free riding is recognized in economics as one of the reasons for the under-provision of certain types of goods, which may include new ideas in the absence of IP protection.[534] Intuitive's "closed" system increases its ability to protect its IP, increasing its incentives to continue investing in new innovations.

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[531] *See* ¶ 185 above.

[532] A third party can also "free ride" on a company's reputation or brand. For example, in an SIS slide deck titled "da Vinci EndoWrist Repair Process," SIS claims that the "serviced device will function identically to a new OEM EndoWrist." SIS091199 at slide 2. *See also* SIS001684.

[533] Pindyck and Rubinfeld at p. 693.
The concept of "free riding" is also captured in the testimony of Rebotix personnel; *see* Papit (in *Rebotix*) Dep. Tr. 134:5-135:3 ("Q. Has Rebotix ever identified any of its business partners attempting to reverse engineer the Interceptor? A. I have no knowledge of any attempts. Q. Is that something that Rebotix would allow its business partners to do? A. No. Q. Why not? A. Because it's our process that we patented, and it's our repair product. Q. Any other reasons why? A. Why would we just give that away? It just doesn't make any sense. Q. Rebotix invested a lot of money into developing that technology, right? A. That – that's part of the correct answer. …Q. What's the rest of the correct answer? A. A lot of time and a lot of openings created in the marketplace by us.")

[534] *Id.* Specifically, free riding can lead to the under-provision of public goods, which are goods for which "marginal cost of provision to an additional consumer is zero and people cannot be excluded from consuming it" (Pindyck and Rubinfeld at p. 690). New ideas without IP protection may constitute a public good since ideas can be shared across many people at no additional cost.

Even with protection, IP litigation can be costly to the innovator (in financial terms and with respect to time), and the use of the IP by the third party may have already cause irreparable harm. Thus, the innovator has an incentive to deter "free riding" before it happens.

215. In contrast to Professor Elhauge's portrayal that third-party companies such as Rebotix, Restore, and SIS were foreclosed from selling reset EndoWrists to hospitals that purchased or allegedly would have made purchases,[535] third parties' efforts to work around Intuitive's safeguards to reset EndoWrist instruments is opportunism in the form of "free riding." Third-party companies benefit from the IP underlying the da Vinci Surgical System without paying for the investment costs.[536] The fact that some of these third-parties' prices are set as a percentage of Intuitive's list prices, as opposed to their costs, is indicative that third-parties are free-riding on Intuitive's innovations.[537] Under this pricing scheme, third-parties' purportedly earn gross profits up to 85-90 percent on EndoWrist resets.[538] Third-parties' are profiting from Intuitive's IP and investments without paying the costs.

216. One of the alleged harms that Professor Elhauge describes in his report is reduced innovation.[539] According to Professor Elhauge, direct evidence that the alleged exclusionary restraints slowed innovation include (1) Intuitive "abandoned its own efforts to provide repaired EndoWrists and

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[535] *See*, e.g., Elhauge Report, ¶¶ 269-276.
Intuitive's alleged misconduct would not preclude third-party companies from selling legitimate surgical device repairs. Mr. Posdal stated that SIS's business outside of reset EndoWrist instruments has not experienced any negative impact from its inability to sell reset EndoWrist instruments. Posdal 30(b)(1) (11/1/2022) 64:22-65:12 ("Q. Okay. Did SIS's inability to move forward with the reset business impact its reputation at all? A. Separate from our existing service, I don't believe so. Q. What do you mean separate from your existing service? A. Well I -- I think that any question of our ability to service the EndoWrists had no impact on the -- the existing services we were providing in a negative way. Q. Okay. So there was -- there was no negative impact from the inability to -- to provide the EndoWrist services on the rest of SIS's business; is that right? A. I think that's correct.").

[536] Similarly, a healthcare provider that breaches the SLSA with Intuitive and seeks a third party reset of the EndoWrist instrument is "free riding" on Intuitive's innovations. The pecuniary "savings" that the healthcare provider achieves are taken at Intuitive's expense, although the healthcare provider did not share in the costs of investing in the technology.

[537] For example, Rebotix priced its service at a set 40 to 50 percent discount to Intuitive's list prices. *See* Papit (in *Rebotix*) Dep. Tr. 179:10-181:4.

[538] *See* Mills Exhibits 18-25, divide the difference between "1. Lost Revenues" and "2.A. Avoided Costs – Variable" by "1. Lost Revenues".

[539] Elhauge Report, ¶¶ 347-348.

excluded rivals from doing so" and (2) Intuitive "has been artificially suppressing the use counter limit on its EndoWrists and has never even tested to see if those of the S/Si compatible EndoWrists could be increased like those of the X/Xi-compatible ones."[540] Professor Elhauge also claims that "absent Intuitive's conduct, firms would have the incentive to develop a way to reset the counter for X/Xi compatible EndoWrists."[541]

217. Even accepting Professor Elhauge's claimed links between the challenged conduct and claimed foregone investments, which I do not agree with, Professor Elhauge's assessment of "reduced innovation" is narrowly focused on EndoWrist resets and the use limit of S/Si instruments. He fails to acknowledge that the challenged conduct has preserved Intuitive's incentives to innovate. Intuitive has made innovations across multiple facets of the da Vinci Surgical System, including launching four generations of the system and developing a wide variety of instruments.[542] Intuitive continues to innovate and considers "long-term opportunit[ies]" that may take as many as 11 years to realize a positive earnings.[543] Moreover, in his assertion that Intuitive has "excluded rivals," Professor Elhauge again erroneously equates Intuitive's contemplated instrument refurbishment program with the reset EndoWrists of third-party companies such as Rebotix, Restore, and SIS, which differ substantially.[544]

218. With its integrated surgical system, Intuitive has continued to invest at a level that is consistent with the protections afforded to them by the challenged conduct, as predicted by economic theory. Intuitive's reported annual R&D expenditures have grown from $11.1 million in 1999 to $671.0 million in 2021.[545] As a share of revenue, annual R&D expenditures increased from 7-9

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[540] Elhauge Report, ¶ 348.

[541] Elhauge Report, ¶ 264.

[542] *See* ¶ 28 above. *See also* ¶ 210 above.

[543] *See* Intuitive-01172899 ("Long-term opportunity portfolio assessment") at -903 and Intuitive-01172908 (e.g., tab "DMR"). I understand that "DMR" stands for "Duodenal Mucosal Resurfacing" and is a procedure developed to treat diabetes; *see* Intuitive-00147125 at -131.

[544] *See* ¶ 192 above, particularly ¶ 192a. and ¶ 192b.

[545] Intuitive 2021 10-K at, p. 84. *See also* Public Data Workpaper.

percent between 2005 and 2016 to 12 percent in 2021.[546] Intuitive's R&D expenditures have contributed to the development of the innovative products highlighted above[547] and enabled Intuitive to maintain its public perception as an innovative company in the industry.[548]

219. Intuitive likely would reduce its investments in innovation if the protections provided by the challenged conduct were not allowed. Companies may rationally decline to invest in an innovative project if the expected return is below the estimated costs.[549] Indeed, Intuitive evaluates the costs and expected benefits of new product development in deciding how to allocate the company's resources.[550] Therefore, compelling Intuitive to change how it chooses to sell its product (as an integrated system) could have adverse consequences on innovation.

220. Professor Elhauge raises what he portrays as an inconsistency: "preventing rival competition from 'free-riding' in a way that reduces innovation" requires an assumption that the alleged restraints "enabled Intuitive to earn ***higher*** prices that would encourage more investment in innovation."[551] This assertion is false for multiple reasons. First, innovation does not necessarily imply higher prices because the relevant point of comparison is what price would the customer have paid absent the innovation. Intuitive's Extended Use Program is an example where

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[546] *See* Public Data Workpaper, which includes a comparison of Intuitive's share to those of publicly traded companies that it named in its 2019-2021 Form 10-Ks and companies named in IBISWorld's 2020 report on "Robotic Surgery Equipment Manufacturing." Intuitive's R&D as a share of revenue is in line with the other companies and, after 2014, is higher than that of companies such as Medtronic.

[547] *See* ¶¶ 83, 210 above.

[548] *See* fn. 523 above.

[549] *See*, e.g., Jonathan Berk and Peter DeMarzo, *Corporate Finance, Fourth Edition* (Essex: Pearson Education Limited, 2017), 101.

[550] *See*, e.g., in Intuitive-00601505 ("Product Portfolio Guidelines") on funding of R&D programs; and Intuitive-00293400 ("da Vinci SP, Business Review III," April 2017) on the business plan prior to the launch of the da Vinci SP in 2018; and Intuitive-01172898 (cover email), Intuitive-01172899 ("Long-term opportunity portfolio assessment") and Intuitive-01172908 ("Opportunity portfolio assessment_v50.xlsx") on analyzing long-term opportunities.

[551] Elhauge Report, ¶ 391 (emphasis in original).

innovation reduced price per use for 13 Xi instruments.[552] As another example, evidence indicates that Intuitive designed the X platform (which Intuitive launched in 2017) to be comparable to the Xi platform (which Intuitive launched in 2014, or three years prior) at a lower price point; customers looking to purchase a 4th-generation platform otherwise would have only the option of the Xi platform.[553]

221. Second, as discussed in more detail in the next section, if Intuitive is constrained in its ability to price components of the da Vinci Surgical System as a bundle, then economic principles indicate that the company may resort to pricing strategies that are more expensive for customers, possibly in the form of higher prices or increased risk. For example, when faced with third-party resets, Intuitive reduced its price on instruments and increased its price on the platform or on its servicing plans (which are "lumpy" in timing of payments) to protect its ability to invest, then healthcare providers may bear greater financial risk when faced with uncertain da Vinci surgical volumes. Other ways in which Intuitive's customers may be negatively impacted include reduced access to the da Vinci Surgical System and lower quality of the system's components.[554]

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[552] When increasing the usage limit on certain EndoWrist instruments for the Extended Use Program, Intuitive made design changes to ensure that the extended-use instruments would perform to the same standards as its 10-use instruments. *See* Intuitive-00560028 ("Extended Use Program") at -034-036.

[553] Shaw (10/19/2022) Dep. Tr. 21:12-15 ("A. …the da Vinci X was developed to have a lower cost capital system available for customers with lower capabilities specifically to meet certain procedure needs that the customers had.") and 131:25-132:4 ("Intuitive initiated Phoenix or da Vinci X as a way to buy -- to offer a lower cost fourth generation system to customers for those customers who needed that balance of price point and capability for their needs."). *See also* Intuitive 2021 Form 10-K at p. 12 ("Our fully featured da Vinci Xi Surgical System with advanced instruments, including the da Vinci Energy and EndoWrist and SureForm Stapler products, and our Integrated Table Motion product, targets the more complex procedure segment. Our da Vinci X Surgical System is targeted towards price sensitive markets and procedures.") and p. 55 ("We have commercialized the following da Vinci Surgical Systems: The da Vinci standard Surgical System in 1999, the da Vinci S Surgical System in 2006, the da Vinci Si Surgical System in 2009, and the fourth generation da Vinci Xi Surgical System in 2014. We have extended our fourth generation platform by adding the da Vinci X Surgical System, commercialized in 2017.").

[554] *See* ¶ 226 below.

D. INTUITIVE IS ABLE TO OFFER CUSTOMERS A SUPERIOR FINANCIAL DEAL WITH AN INTEGRATED PRODUCT

222. As discussed above, customers benefit from Intuitive's integrated system (or "bundle") because the integrated system protects patient safety and preserves incentives to innovate. In addition, customers likely benefit from lower overall costs and greater access to the da Vinci Surgical System with Intuitive's "bundle" than with separate components. Professor Elhauge claims that whether customers benefit financially from Intuitive's strategy to sell the da Vinci Surgical System as an integrated product is a "non sequitur because there is no challenge in this case to Intuitive offering superior financial terms."[555] However, Professor Elhauge appears to not understand that the challenged restraints enable Intuitive to offer superior financial terms that lower costs and increase access to the da Vinci Surgical System for healthcare providers and ultimately patients, as discussed in more detail below. I first summarize the economics of bundling of complements and cost savings, both to the customer and to the manufacturer. Then, I discuss how Intuitive's pricing strategy likely is efficient and financially beneficial to customers.

223. Academic research has shown that the bundling of goods, including complementary goods, can lead to lower prices for customers.[556] Complementary goods (or simply "complements") are goods for which an increase in the price for one good decreases the demand for the other goods.[557] For example, automobiles and gasoline are complements where higher automobile prices will reduce the number of automobile purchases or leases as well as overall consumption of gasoline because there are fewer cars on the road. Conversely, lowering the price for a good will increase demand for goods that are its complements.

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[555] Elhauge Report, ¶ 390.

[556] *See*, e.g., Bruce Kobayashi, "Does Economics Provide a Reliable Guide to Regulating Commodity Bundling by Firms? A Survey of the Economic Literature," *Journal of Competition Law and Economics* 1, No. 4 (2005): 707-746 for a survey of the economics literature on bundling through the time when the article published. Discussions of lower prices for bundles of products, including complementary products, can be found at, for example, pp. 708-710, 714, and 738-739. *See also* Hooman Estelami, "Consumer Savings in Complementary Product Bundles," *Journal of Marketing Theory and Practice* 7, No. 3 (1999): 107-114.

[557] Pindyck and Rubinfeld at p. 24.

224. Economic principles lead to the prediction that the price of a bundle of complementary goods is lower than the sum of the prices when the goods are sold separately by two different suppliers.[558] The reason is that the supplier that sells the bundle internalizes the "spillover" in demand from one good to its complement(s). In other words, the supplier is willing to offer a lower price on a good when it is able to realize the additional sales of the complementary goods. Customers benefit from lower prices, and the supplier achieves higher profits.[559] This win-win situation makes bundles of complements attractive to both customers and suppliers and, understandably, is common in retail (e.g., right shoes and left shoes, vacation packages).[560]

225. By selling an integrated system or "bundle," Intuitive is able to efficiently respond to competitive conditions and customer needs as exemplified by its pricing discounts or concessions and leasing arrangements:

a. Intuitive can offer discounts and pricing concessions on the da Vinci platform, service, or instruments and accessories.[561] Discounts aim to "[remove] a barrier for customers to expand their business with [Intuitive]," and Intuitive prioritizes discounts on the da Vinci platform before discounts on system servicing and on instruments and accessories.[562] For example, in

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[558] Jay Pil Choi, "Mergers with Bundling in Complementary Markets," *Journal of Industrial Economics* 56, No. 3 (2008): 555 (Choi shows that, in the short-run, a merged firm will "reduce the price of its bundled system and expand market share relative to the situation prior to the merger. Prior to the merger, any price cut by one of the merging firms would tend to benefit the other's sales. …Following the merger, however, the merged entity can 'internalize' these 'pricing externalities' arising from the complementarity of their components by reducing the price of the bundle to below the level the two players would choose if acting independently.").

[559] Suppliers may also benefit from lower costs of selling a bundle rather than individual goods; see David S. Evans and Michael A. Salinger, "The Role of Cost in Determining When Firms Offer Bundles," *The Journal of Industrial Economics* 56, No. 1 (2008): 144-145.

[560] Pindyck and Rubinfeld at p. 426 (vacation package example); David S. Evans and Michael Salinger, "Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law," *Yale Journal on Regulation* 22, 37 (2005): 40-41 (on examples of tying in competitive markets).

[561] Intuitive-00372053 ("DiscountingPrinciples_v2.docx"); Intuitive-00021011.xlsx ("Concessoin [sic] Planning OVerview [sic] w BU + Sales Input.xlsx").

[562] Intuitive-00372053 at -053.

a pricing negotiation with Benefis Health System, Intuitive offered a discount on the da Vinci platform (that was on par with discounts with other customers) and accommodated Benefis' request regarding its service contract, but it did not offer discounts or differential pricing on instruments ("disposables") because of the company's "strong one-price policy" related to instruments and accessories.[563]

b. Intuitive has developed alternative pricing arrangements in which the company shares financial risk with the customer.[564] For example, Intuitive offers various leasing arrangements with customers, including operating leases (which are a "straight-line" payment over the lease term) and usage-based arrangements (which are payments made "as the systems are used").[565] These arrangements offer "customers with flexibility regarding how they acquire or obtain access to [Intuitive's] systems."[566]

226. If Intuitive was unable to sell an integrated system and thereby deter third parties from intervening with system components, then the overall price of the system likely would increase or the quality of the product—measured by patient safety and clinical outcomes or by innovation—would suffer. If Intuitive were not free to protect the safety and welfare of patients, and by extension Intuitive's reputation and financial viability, through contractual provisions, the economically rational response could be to change its pricing strategy to achieve as much system integration as possible (e.g., perhaps by increasing its prices for da Vinci platforms and lowering

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563 Intuitive-00203904 at -905.

564 The sale of instruments on a per-use basis is also a form of risk sharing between Intuitive and its customer. Before acquiring a da Vinci platform, the customer faces some uncertainty about its volume of da Vinci surgeries. Because instrument sales are proportional to the customer's volume of procedures and costs are incurred over time, a portion of the overall cost of the da Vinci Surgical System is therefore spread out and varies with the customer's realized volume.

565 Intuitive 2019 Form 10-K at pp. 47-48. Between 2018 and 2019, Intuitive reported that the share of da Vinci Surgical Systems that were shipped as leases increased from 25 percent to 34 percent (Intuitive 2019 Form 10-K at p. 57). An example of a usage-based arrangement is AMP, or "accelerating minimally invasive program." *See* Rosa (in *Restore*) Dep. Tr. 25:13-15 and 27:15-32:3 (on AMP).

566 Intuitive 2019 Form 10-K at p. 47.

its prices for EndoWrist instruments). Standard economic principles would dictate that Intuitive's re-optimization under such a constraint on its contracting practices likely would harm consumers.[567] One potential consequence is reduced access to the da Vinci Surgical System for some healthcare providers as well as patients who would otherwise have da Vinci surgeries as a treatment option. Alternatively, as discussed above, the quality of the da Vinci Surgical System may decrease if Intuitive is unable to maintain its tight control over patient safety or if Intuitive does not expect to realize returns on its innovative endeavors that would justify the investment costs.[568] In all of these circumstances, Intuitive's direct customers (healthcare providers) as well as surgeons and patients likely would be worse off when Intuitive cannot sell its surgical system as it designed, created, and commercialized.

227. Professor Elhauge claims that "evidence shows that in fact the restraints have imposed far worse financial terms on hospitals."[569] To show that Intuitive has been charging healthcare providers higher prices, Professor Elhauge cites to (1) Intuitive's refurbishment initiative in 2017 known as Project Dragon, (2) Intuitive's higher instrument prices than those of "rival MIST surgery robot instruments on a per-use basis," and (3) Intuitive's higher instrument prices relative to third-party EndoWrist resets that are "functionally equivalent."[570] Each of these purported reasons are inapt:

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[567] *See*, e.g., Tirole at p. 16 ("A well-known rationale for tying is that a tie enables the metering of demand and prices to depend on consumer usage. …suppose that some consumers use M on a stand-alone basis while others use M in combination with C or C'. Under unbundling, the producer of M is forced to charge a single price for M, even though the two groups' willingness to pay may be quite distinct. For example, if consumers without demand for the complementary product have a low willingness to pay for M, the producer of M may end up charging a high price for M and prevent them from consuming. By contrast, a tie enables the producer of M to charge a low price for the basic good and a high price for the combination, which avoids excluding the first group and raises economic efficiency.").

In a draft business plan dated October 29, 1995, Intuitive contemplated that "systems will be placed for little or no charge at sites that sign an annual minimum disposables and [Reposable Transmission Unit] purchase contract" (Intuitive-00595673 at -682-683).

[568] *See* ¶¶ 206-208, 219 above.

[569] Elhauge Report, ¶ 390.

[570] Elhauge Report, ¶ 187.

a. As discussed above, Intuitive's contemplated refurbished instruments are substantively different from that of third-party reset EndoWrists.[571] Evidence indicates that a key objective of Intuitive's initiative to explore the option of instrument refurbishment was to reduce cost per procedure and grow da Vinci procedures, particularly in areas where perceived cost may be a barrier.[572] Discussions of instrument refurbishment, including the decks cited by the Plaintiffs, precede the date of the first sale of EndoWrist resets by Rebotix, Restore, and SIS in the U.S. and focus on European markets.[573] Contrary to Professor Elhauge's claim that Project Dragon did not proceed because Intuitive "was able to exclude rivals using the challenged restraints and did not feel the need to offer these discounts,"[574] Evidence indicates that Intuitive has not launched an instrument refurbishment program like Project Dragon

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[571] *See* ¶ 192 above.

[572] *See*, e.g., Intuitive-00273264 at -285 ("The remanufactured instrument is a 'Program', a joint project between the customer and Intuitive Surgical, to facilitate higher adoption of robotic minimally invasive surgery by lowering instrument cost-per-procedure."). *See also* Intuitive-00594883 at -884 and Intuitive-00273264 at -291 to -294.

[573] For example, Intuitive-00273260 (cover email to Intuitive-00273264) is dated May 23, 2017. Project Dragon was piloted in France and Germany. *See* Intuitive-00273264 at -291-294 (France), Scoville (in *Rebotix*) Dep. Ex. 7 at -443 (France and Germany). Tourand (11/4/2022) Dep. Tr. 37:14-21 ("Q. In 2016 or 2017, you visited French hospitals to gauge their openness to using refurbished EndoWrists; is that right?...A. I do recall, in 2017, visiting French customers to understand their needs for instrumentation and presenting an idea of recycled instruments."). *See also* Tourand (11/4/2022) Dep. Ex. 202 at -969-972.

Rebotix's first sale of a reset EndoWrist instrument is dated March 6, 2019. Papit (in *Rebotix*) Dep. Tr. 232:11-20 ("Q. Mr. Papit, I think you were just saying that this document contains all of the transactions that Rebotix Repairs has entered into with customers regarding EndoWrist instruments, right? A. Correct. Q. Okay. So there aren't any transactions that Rebotix Repairs has entered into for EndoWrist that wouldn't be included in this exhibit; is that right? A. That's correct, should not be."). *See also* Papit (in *Rebotix*) Dep. Tr., Exhibit 17 (REBOTIX165979).

Restore's first sale of a reset EndoWrist instrument is dated July 11, 2018. Restore-00055935; Restore-00055937.

SIS's first sale of a reset EndoWrist instrument is dated June 28, 2019. SIS000167.

[574] Elhauge Report, ¶ 187.

because of the high costs entailed to refurbish EndoWrists to the specifications that would meet Intuitive's quality standards.[575]

b. The cost of instruments for "rival MIST surgery robots" is not an appropriate comparison because of the differences in the technology. For example, I understand that the instruments for TransEnterix more closely resemble those of traditional laparoscopic instruments than Intuitive's EndoWrists, which also limits the range of motion for the TransEnterix's instruments.[576] In addition, evidence indicates that surgeons perceive a distinct difference in quality between TransEnterix and other RAS systems compared with the da Vinci Surgical System. For example, in a 2020 survey of surgeons who use the X system, 21 percent of surgeons had tried a "new RAS technolog[y]," including 9 percent who had tried TransEnterix, in the past 12 months.[577] Among surgeons who had tried TransEnterix, some perceived no benefits: "it seems to be an inferior system/it is awful."[578] Other RAS systems were either too early to provide meaningful feedback or were less "intuitive," more "bulky" in size, and/or worse visualization.[579]

c. Evidence indicates that third-party EndoWrist resets and Intuitive's new EndoWrist instruments are not "functionally equivalent."[580] Even if they were "functionally equivalent," it is unreasonable to expect that the prices would be the same given that Intuitive bears the costs of EndoWrist research, development, and manufacture, which are not borne by third-

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[575] *See* ¶ 192 above.

[576] Longmore et al., p. 14 ("While the da Vinci EndoWrist instrument has end effectors that have similar function to the human wrist, Senhence instruments are more like traditional laparoscopic instruments. Some Senhence instruments do not have a wrist at the end, but simply have the end effector, for example forceps, at the end of the instrument shaft. While some instruments appear to display some limited flexion and extension movement like da Vinci EndoWrist, but with less range of motion.").

[577] Intuitive-00906928 ("2020 Surgeon Xi Satisfaction Study") at -955.

[578] Intuitive-00906928 ("2020 Surgeon Xi Satisfaction Study") at -956.

[579] Intuitive-00906928 ("2020 Surgeon Xi Satisfaction Study") at -957-958.

[580] Howe Report, ¶ 103

party resetters. Moreover, Intuitive is the OEM and that OEMs typically are able to charge higher prices than third parties.[581]

228. Although Professor Elhauge posits that Intuitive's behavior has suppressed output, evidence indicates that the opposite is true: Intuitive works with healthcare providers to increase use of the da Vinci Surgical System, both operationally and financially. As discussed above, Intuitive has developed financial arrangements to help accommodate the circumstances of the provider.[582] Operationally, Intuitive works with both hospitals and surgeons to identify ways to increase efficiency in the operating room.[583] Intuitive has also developed tools to support hospitals and surgeons in communicating the clinical and economic value of da Vinci procedures with patients.[584]

229. Professor Elhauge claims that the conditions in this case are not conducive to a Single Monopoly Profit argument.[585] Because Intuitive does not have monopoly power and does not behave as a monopolist (as discussed in Sections IV and V above), the question of whether Intuitive can earn monopoly profits even with the "entry" of third-party companies is not relevant. Instead, the relevant point is that Intuitive's pricing strategy has benefited and continues to benefit its direct customers (healthcare providers) through superior financial terms, as well as surgeons and

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[581] Jack Curran, "Medical Equipment Repair & Maintenance Services," Industry Report OD4964, IBISWorld, December 2021 ("Curran") at p. 18.

[582] Intuitive 2019 Form 10-K at pp. 47-48. Between 2018 and 2019, Intuitive reported that the share of da Vinci Surgical Systems that were shipped as leases increased from 25 percent to 34 percent (Intuitive 2019 Form 10-K at p. 57). An example of a usage-based arrangement is AMP, or "accelerating minimally invasive program." *See* Rosa (in *Restore*) Dep. Tr. 25:13-15 and 27:15-32:3 (on AMP).

Intuitive 2019 Form 10-K at p. 47

[583] Intuitive-00014355 at -358-359. Intuitive reviews opportunities to improve efficiency for customers both during and outside of surgical procedures. *See also i.d* at -368-371 for digital solutions to improving operational efficiency.

[584] QTI is the primary strategy by which Intuitive does this. Intuitive-00916726 provides an introduction to what QTI is and the QTI process. Intuitive-00918259 is a specific example of a QTI process using data from Tacoma General Hospital provided by Dr. Laila Rashidi.

[585] Elhauge Report, ¶¶ 369-375.

patients, who have better access to the da Vinci surgical solution, relative to Professor Elhauge's proposed but-for world in which Intuitive is constrained in its ability to sell its surgical system as an integrated product.

230. In summary, under its current go-to-market strategy where Intuitive can sell the da Vinci Surgical System as an integrated product (as it is and always has been sold),[586] Intuitive offers discounts on its surgical system to allow more customers access to their products.[587] If Intuitive were forced to incur the risk to their reputation associated with third-party servicing and EndoWrist resets, its rational response would be to change its business model and associated pricing strategy. Instead of offering platform discounts to widen the reach of their technology, they may be induced to raise platform prices to hedge against the liability and reputational risks these third parties represent, which, in turn, may result in less access to da Vinci Surgical Systems and reduced choice of surgical modality for patients.

VII. ATTEMPTS BY THIRD-PARTY COMPANIES TO SELL RESET INSTRUMENTS REFLECT AN INTEREST IN RENT EXTRACTION, NOT COMPETITION

231. Professor Elhauge portrays third-party companies selling reset EndoWrist instruments and da Vinci "servicing" as "innovative rivals" to Intuitive.[588] According to Professor Elhauge, the exclusion of such "rivals"—including Rebotix, Restore, and SIS—would lead to "five concrete forms of economic harm, including (1) higher prices and lower output resulting from higher prices, (2) suppressed use limits, (3) loss of buyer choice, (4) reduced innovation, and (5) higher environmental costs."[589] In the prior section (Section VI), I discussed why Intuitive's business practices are procompetitive and these harms are not present. Another reason why the alleged anticompetitive harms are not present is because Professor Elhauge's analysis assumes that the third-party companies are competitors who developed and sell a product that is comparable to the

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586 *See* Section III above.

587 Intuitive-00372053 at -053.

588 Elhauge Report, ¶ 332.

589 Elhauge Report, ¶ 332.

services offered by Intuitive—when in fact, the third parties are extracting rents from Intuitive's intellectual property and reputation.

232. The third-party companies have no interest in removing the use counters because they rely on Intuitive's safeguards to keep competition out. In fact, they show serious concern at the prospect of increased competition in EndoWrist resets. For example, Ricardo Ferreira of Alliance Healthcare, a company that worked with Restore Robotics,[590] became concerned when he found out that Restore was not the only company selling EndoWrist resets.[591] In Mr. Ferreira's own words, "[M]y strategy's going to have to change from I'm giving you an offer that nobody else can give you to I've got an offer that somebody can give you but I'm better."[592] Similarly, when asked why he would not allow a business partner to reverse engineer the technology to circumvent Intuitive's use counter, Glenn Papit of Rebotix explained that it had invested a lot of money into developing the technology and created openings in the marketplace.[593] These

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[590] Ferreira (in *Restore*) Dep. Tr. 11:21-12:1 ("Q. …Were you contemplating at the time that Alliance would seek to procure customers for Restore Robotics' instrument repair services? A. Correct. Yes.").

[591] Ferreira (in *Restore*) Dep. Tr. 41:20-42:18 ("Q. You wrote on April 4, 2019, to Mr. Parker, 'Clif, These guys are clearly marketing that they are in business and offering the service. This is -- will complicate our selling efforts in the field. We need to get this addressed and if they are going to be a competitor, change our strategy.' You see that? A. Yep. Q. So who are the 'these guys' you reference in your email? A. Herzog, Alpin Surgical, and the robotic -- the Rebotix folks. … Q. And when you refer to 'offering the service,' did you mean EndoWrist instrument repair? A. Yes. Q. And you wrote the – 'This will complicate our selling efforts in the field.' What did you mean by that? A. Because at the time I believed that Restore were the only people that were -- were doing this and said they could do this."). *See also* AHP004630 at -630.

[592] Ferreira (in *Restore*) Dep. Tr. 48:1-9 ("Well, when I first went out to speak to customers about this, I was telling them that we were the only ones. Restore -- we were the only ones that were able to do this at this time. So now -- so now my strategy's going to have to change from I'm giving you an offer that nobody else can give you to I've got an offer that somebody else can give you but I'm better. That's what it means about changing our strategy.").

[593] Papit (in *Rebotix*) Dep. Tr. 134:2-135:3 ("Q. Has Rebotix ever identified instances of patent infringement by any of its business partners? A. Not to my knowledge. Q. Has Rebotix ever identified any of its business partners attempting to reverse engineer the Interceptor? A. I have no knowledge of any attempts. Q. Is that something that Rebotix would allow its

companies take advantage of the competitive opportunity created both by Intuitive's innovations and the protocols that it places to ensure patient safety. Without Intuitive's innovations and the associated safety protocols, these third-party companies would not have a "service" to offer.

233. That third-party companies are not interested in competing is also evident in the fact that there are numerous legitimate markets for medical equipment repair where Rebotix, Restore, and SIS can (and sometimes do) compete,[594] and yet these third-party companies have spent significant time and money trying to circumvent EndoWrist counters and Intuitive contract provisions.[595]

234. Even if one were to incorrectly conclude, as Professor Elhauge does, that Intuitive anticompetitively foreclosed third parties from competing, the foreclosure share would not be

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business partners to do? A. No. Q. Why not? A. Because it's our process that we patented, and it's our repair product. Q. Any other reasons why? A. Why would we just give that away? It just doesn't make any sense. Q. Rebotix invested a lot of money into developing that technology, right? A. That – that's part of the correct answer. …Q. What's the rest of the correct answer? A. A lot of time and a lot of openings created in the marketplace by us.").

[594] Key personnel of Rebotix serviced medical devices for other manufacturers through Benjamin Biomedical. Gibson (*in Rebotix*) Dep. Tr. 19:6-9 ("Q. …What services does Benjamin Biomedical provide its customers? A. Repair services of Ethicon Harmonic scalpels, phaco handpieces, and surgical cameras."); Papit (*in Rebotix*) Dep. Tr. 32:13-21 ("Q. Do Benjamin Biomedical and Rebotix Repair share any employees? A. Yes. Q. Who are those employees? A. Greg Fiegel does services for both, Chris Gibson does services for both, and I do services for both, and there are several technicians -- I shouldn't say several. There's one or two technicians who are cross-trained.").

Restore began selling PPE since February or March 2020 and "providing service for the Stryker Neptune 2 Rover system" since April or May 2019 (Vautrot (*in Restore*) Dep. Tr. 29:9-17, 32:14-20, 40:6-9). On its website, Restore also advertises that it provides "[m]edical [d]evice [r]epairs" for ventilators, flexible endoscopes, rigid endoscopes, cameras and ultrasound probes, and fluid waste management systems; *see* "Restore Robotics", Restore Robotics, accessed January 16, 2023, https://www.restorerobotics.com/.

See fn. 535 above (for SIS).

[595] Mills Report, ¶ 72 for Rebotix investment. *See also*, Parker (10/25/2022) Dep. Tr. 136:23-137:10 ("A. And then paying for the – the – the development of the product that we call the reader. And then the – what we're calling the – the Xi development, that's been multiple phases, so I don't have the numbers in front of me, but you're talking 1.3 million, 1.4 million, in that range. Q. Would that include the purchase of the robot? A. Yes. That does not include any of our personal time, that's just either our money out of pocket and/or the – the equity for the robot.").

100 percent as Professor Elhauge claims.[596] Rather, in a but-for world where third parties sell EndoWrist resets or da Vinci System servicing or both, evidence indicates that many hospitals would continue to purchase EndoWrists and servicing exclusively from Intuitive as the original manufacturer. As Dr. Francis, the former chief of surgery at Franciscan explained when asked why he would want to know if Intuitive approved of reset EndoWrists before using them, "whoever designed the instrument would have put the time into measuring what the appropriate length of use in that instrument would be, so I would want to know if those -- what those engineers would recommend."[597]

235. This sentiment is reflected in the medical repair and maintenance industry as a whole. Despite the fact that original equipment manufacturers ("OEMs") typically charge higher prices than independent service organizations ("ISOs"), [598] they capture the vast majority of medical repair and maintenance revenue (75.4 percent compared to 24.6 percent by ISOs).[599] The "highly-regulated nature of medical equipment and the potential loss of life associated with poor repairs" tends to lead customers to choose OEMs over ISOs.[600] This can be even more pronounced for highly technical equipment like the da Vinci System.[601] This may explain why even some healthcare providers that chose to purchase reset EndoWrists did not feel comfortable using a third-party company to "repair" their da Vinci robots.[602] Given the option between Intuitive and third-party alternatives, many healthcare providers likely would still choose Intuitive for their servicing and EndoWrist needs, precisely because of Intuitive's commitment to ensuring its instruments work safely and reliably.

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596 Elhauge Report, ¶ 265.

597 Francis (10/14/2022) Dep. Tr. 23:2-25:17.

598 Curran at p. 18.

599 *Id* at pp. 17-18.

600 *Id* at p. 18.

601 *Id* at p. 17.

602 Harvey (in *Restore*) Dep. Tr. 81:8-17 ("Q You gave testimony to the effect of, with servicing, that you decided not to move forward with servicing of da Vinci instruments that Restore could provide; is that correct? A Yes. Q Okay. And the reason you did that, I think if I recall, is that you had not investigated servicing -- the servicing aspect of it, and you didn't feel comfortable proceeding with that? A Correct.").

VIII. PROFESSOR ELHAUGE'S DAMAGES ANALYSIS FAILS TO CONSIDER AN APPROPRIATE BUT-FOR WORLD AND SUFFERS FROM OTHER METHODOLOGICAL FLAWS

236. For the reasons set forth above in this report, Intuitive's conduct has been procompetitive, and thus the claims of the Plaintiffs lack merit, and no damages are warranted. Notwithstanding this opinion, in this section I evaluate Professor Elhauge's damages analysis under the assumption that the Plaintiffs will prevail on their claims. For the reasons outlined below, I find that Professor Elhauge's estimated damages are unreliable and inflated.

237. Professor Elhauge purportedly calculates damages to each of the three Named Plaintiffs and all proposed class members from (1) higher EndoWrist "repair and replacement" prices in the actual world, (2) lower use limits in the actual world, and (3) higher da Vinci servicing prices in the actual world. For EndoWrist "repair and replacement," he first computes damages from higher prices and lower use limits separately, and then computes "combined damages" from the two effects.[603]

238. For purported damages related to the sale of EndoWrist instruments, Professor Elhauge assumes that but-for entry by third-party companies would have occurred either before the beginning of the Class Period, May 2017, or when the first reset EndoWrist was sold by a third party on July 11, 2018.[604] For purported damages related to da Vinci servicing, Professor Elhauge assumes that but-for entry would have occurred either before the beginning of the Class Period, May 2017, or when da Vinci servicing was first sold by a third party on January 14, 2019.[605] Depending on the but-for entry date, Professor Elhauge's total classwide damages from higher EndoWrist prices, lower EndoWrist use limits, and higher da Vinci servicing prices range from $2.097 billion to $2.764 billion.[606]

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[603] Elhauge Report, § V.II.A.
[604] Elhauge Report, ¶¶ 398, 403.
[605] Elhauge Report, ¶ 415.
[606] Elhauge Report, Table 9

239. As I outline below, Professor Elhauge's damages analysis suffers from a number of fundamental conceptual and methodological flaws, resulting in damages estimates that are economically unsupportable and, at a minimum, significantly inflated. In the following Sections A and B, I discuss the following shortcomings in more detail:

- Professor Elhauge ignores the demand complementarity of the components of the da Vinci Surgical System and fails to consider incentive to increase Intuitive's surgical robotic platform prices if EndoWrist or system servicing prices were reduced.

- Even setting aside the complementarity of the components of the da Vinci Surgical System, which is economically inappropriate, there are a wide array of plausible pricing strategies for Intuitive, including price increases on some components of the da Vinci Surgical System. Understanding Intuitive's likely strategic responses in the relevant but-for world requires a detailed economic analysis, which Professor Elhauge does not provide.

- Professor Elhauge inappropriately disregards the influence of FDA clearance on the demand for third-party reset EndoWrist instruments.

- Based on the testimony of third-party companies that sell reset EndoWrists, Professor Elhauge concludes the third parties would have an increased incentive to reset X/Xi EndoWrists, and thus they would have done so (as early as the beginning of the class period). Even if one accepts that third parties would have a greater incentive to invest in technology to bypass X/Xi EndoWrist counters, there is no evidence that they would have had an increased *ability* to do so, especially as early as 2017.

- In the face of direct evidence to the contrary, Professor Elhauge assumes Intuitive could uniformly extend use limits on all S/Si and X/Xi instruments to 20 uses.

- Professor Elhauge posits that Intuitive would be incentivized to give a 20 percent price discount *and* double its use limits in the but-for world when calculating "combined damages." This effectively reduces Intuitive's instrument prices by 55.4 percent, resulting in a but-for price that is even lower than Professor Elhauge's "yardsticks" including the observed prices of most reset EndoWrist instruments offered by third parties. As mentioned above, understanding

Intuitive's likely pricing strategies in the relevant but-for world requires a detailed economic analysis, which Professor Elhauge has not provided.

- Despite acknowledging that there are what he calls "incontestable" da Vinci System services, Professor Elhauge applies a uniform 24 percent price discount to *all* da Vinci services in his posited but-for world. Again, understanding Intuitive's likely strategic pricing decisions in Professor Elhauge's assumed but-for world requires a detailed economic analysis, which Professor Elhauge fails to provide.

- Based on an assertion that Abbott Laboratory and Intuitive are "similar," Professor Elhauge uses Abbot's proffered service margins as a "yardstick" for what Intuitive's system servicing margins should have been in the but-for world. However, EBIT margins may differ across firms for any number of reasons unrelated to the level of competition that each firm faces. For example, in the case of Abbot and Intuitive, the two companies differ substantially in size and product offerings such that one might not expect their service profit margins to be comparable.

- Professor Elhauge's analysis of da Vinci service damages also suffers from several methodological errors that render his estimate of Intuitive's but-for service prices unreliable.

A. PROFESSOR ELHAUGE'S PURPORTED DAMAGES RELATING TO THE SALE OF ENDOWRIST INSTRUMENTS

240. In his first of three quantifications of purported damages relating to sales of EndoWrist instruments, Professor Elhauge assumes that, in the relevant but-for world, third-party companies would have "created competitive pressure requiring Intuitive to offer its own repaired EndoWrists and to lower its own prices for new EndoWrists."[607] Professor Elhauge then applies a price discount of 20 percent to all EndoWrist net sales to estimate damages from the sale of Intuitive's new EndoWrists, Intuitive's "own repaired EndoWrists," and third-party reset EndoWrists.[608] In this quantification, Professor Elhauge finds the damages to all proposed class

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[607] Elhauge Report, ¶ 394. *See also* Elhauge Report, ¶ 335.

[608] Elhauge Report, ¶ 397.

members are $805 million if entry occurs on May 21, 2017 (the beginning of the Class Period) and $631 million if entry occurs on July 11, 2018 (the date the first reset EndoWrist was sold by a third party).[609]

241. In a second alternative quantification of purported damages relating to sales of EndoWrist instruments, Professor Elhauge assumes that the use limits Intuitive incorporated into the design of EndoWrists would have been higher in the relevant but-for world.[610] Professor Elhauge provides two reasons for this assumption. First, he claims that Intuitive's use limits have been challenged as anticompetitive and could be found to be illegal in the relevant but-for world.[611] Second, he posits that third-party companies would have created competitive pressure on Intuitive to raise or eliminate the use limits in the but-for world.[612] In his calculations, Professor Elhauge applies a uniform use limit of 20 to all EndoWrists.[613] Because the use limit for EndoWrist instruments (excluding Extended Use instruments for the da Vinci X/Xi System) in the actual world is usually 10, extending the use limit to 20 is approximately equivalent to a 50 percent price discount in Professor Elhauge's calculations.[614] Using this method, Professor Elhauge finds the damages from lower use limits for EndoWrists to all proposed class members are $1.831 billion if entry occurs on May 21, 2017 (the beginning of the Class Period) and $1.396 billion if entry occurs on July 11, 2018 (the date the first reset EndoWrist was sold by third party rivals).[615]

242. Finally, Professor Elhauge calculates "[c]ombined [d]amages" from the two separate effects related to sales of EndoWrist instruments discussed above.[616] He concludes that the combined

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[609] Elhauge Report, ¶ 402.
[610] Elhauge Report, ¶ 403.
[611] Elhauge Report, ¶ 403.
[612] Elhauge Report, ¶ 403.
[613] Elhauge Report, ¶ 405.
[614] Elhauge Report, ¶ 406.
[615] Elhauge Report, ¶ 408.
[616] Professor Elhauge acknowledges that the "combined effect" would not be the sum of the damages when considering each effect separately. *See* Elhauge Report, ¶¶ 409-410.

damages from higher prices and lower use limits in the actual world to all proposed class members are $2.270 billion if entry occurs on May 21, 2017 and $1.748 billion if entry occurs on July 11, 2018.[617]

1. Professor Elhauge's purported damages associated with sales of EndoWrist instruments suffer from conceptual flaws

243. First and foremost, Professor Elhauge's entire approach to damages is unreliable because he ignores that, as I explained above, Intuitive sells a surgical system composed of complementary components — a surgical robotic platform, EndoWrist instruments, and system servicing — through a single contract with customers.[618] Even if Professor Elhauge wants to consider Intuitive's system as unbundled, it is inappropriate to ignore the complementarity in demand of its components. As I explained above, unbundling the components of the da Vinci Surgical System would incentive Intuitive to change its pricing strategy to achieve as much system integration as possible by, as an example, lowering its price for EndoWrists and increasing the price of the da Vinci platform,[619] which would affect the sale of EndoWrists relative to the expected actual world. In this but-for world, it is likely that hospitals would get a worse financial deal than they would in the expected actual world, which significantly would reduce any claimed damages and potentially even turn them negative.

244. Even setting aside complementarity among the components of the daVinci Surgical System, Professor Elhauge does not conduct any formal economic analysis of Intuitive's competitive response to entry in his asserted but-for world. He assumes that (a) a reset EndoWrist from a third party rival, (b) a repaired EndoWrist from Intuitive, and (c) a new EndoWrist from Intuitive are near perfect substitutes.[620] However, evidence indicates that, from an economic perspective,

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[617] Elhauge Report, ¶ 411.
[618] *See* Section III above.
[619] *See* Section VI.D above.
[620] Elhauge Report, ¶ 395.

new and reset EndoWrist instruments are significantly differentiated products.[621] Given this product differentiation, Intuitive may choose to lower, maintain, or even raise EndoWrist instrument prices to maximize profits in the relevant but-for world. More specifically, Intuitive's optimal strategy may be to cede the price sensitive group to third parties and raise prices to the

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[621] Francis (10/14/2022) Dep. Tr. 23:22-24:23. ("Q. Would you be willing to use an EndoWrist with a circumvented use counter on a patient? …A. No. Q. Why not? A. From what I understand, the number on a repeated use instrument is placed there within a recommendation based on somebody, whether it was the engineers or elsewhere, that stated that was a normal number of uses that would basically give you normal use of the instrument. To go beyond that does not guarantee or in any way imply the instrument will continue to work as designed. And for one, I do not -- I do not like inefficiency. So to have to switch out an instrument that's malfunctioning or not working properly or slowing me down in some way really grates at my performance of operations. Q. If Franciscan were to tell you that its hospitals would be stocking EndoWrists that had reset use counters, how would you react? …A. I -- I would ask specifically if Intuitive had okayed this and what their engineers were saying about it because they're the ones who designed the instrument to begin with."). Estape (10/22/2022) Dep. Tr. 57:18-58:7. ("Q. What do you remember about the meeting? A. Well, a company comes in and says that it can wipe out the number of uses on an instrument that's FDA cleared for only ten uses, I thought that was a pretty interesting meeting. Q. Why was it interesting to you? A. Well, you know, everything that we do in medicine is for safety, you know, and certain things are cleared only by the FDA, and it just seemed like a -- for – I'll just use the word shady, a very shady meeting where, you know, oh, I can take this and I can wipe off the uses for this instrument and you can keep using it forever. It just didn't seem -- you know, it didn't seem like a very up-and-up program. I've never heard of that before."). Maun (11/8/2022) Dep. Tr. 27:7-28:18 ("Q. Would you be comfortable with using an EndoWrist with a circumvented use counter? A. I probably would not use that. Q. Why not? A. Because then I don't know the history of the number… You know, I just don't -- I just don't know the -- what -- how that would function at use nineteen or twenty. Q. What would your concern about the function be at use nineteen or twenty? A. You know, just the wear and tear on the instrumentation, not being able to perform the maneuvers I need to for the operation.").

Note that the refurbishment program (Project Dragon) that Intuitive considered was different from third party resets, which is reflected in the costs associated with it. *See* ¶ 192.a. *See also* Goodson 30(b)(1) (10/27/2022) Dep. Tr. 73:6-13 ("Q. The project [Project Dragon, Refurbishment] was never implemented, correct? A. Correct. Q. Why is that? A. The requirement for demonstrating the reliability of the instruments repeatedly over life and the cost associated with replacing the parts to achieve that reliability and building a business became cost prohibitive for pursuing the project.").

less price sensitive customers that continue to demand new instruments.[622] Among other factors, Intuitive's response would depend on how many of Intuitive's customers would purchase reset EndoWrists from third parties. Evidence indicates that hospitals and surgeons would be reluctant or unwilling to use reset EndoWrist instruments.[623] Hence, it is plausible that Intuitive would maintain its current price or even raise the price of instruments to inframarginal customers while forgoing a small share of sales to third party rivals in the but-for world. This scenario would significantly reduce overall damages relative to Professor Elhauge's estimates, and potentially result in negative damages for customers who prefer new instruments.

245. Professor Elhauge has not appropriately accounted for the role of FDA clearance in hospital purchasing decisions. Evidence indicates that some hospitals and surgeons are hesitant or even unwilling to use instruments without FDA clearance due to quality or safety concerns. For instance, Dr. Estape from Larkin stated that "[…] I'm not willing to do something that's not FDA approved because, you know, anything that happens to the patient, they're going to come down on me for having used equipment that was not FDA approved at that time."[624] Stacey Donovan, executive director of surgical services at EvergreenHealth, testified that "I don't think

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622 *See* e.g., Richard G. Frank and David S. Salkever, "Generic Entry and the Pricing of Pharmaceuticals", *Journal of Economics & Management Strategy 6*, No. 1 (1997), 75–90 ("This result is consistent with the descriptive information reported by Grabowski and Vernon (1992) showing brand-name prices rising relative to generic prices sub-sequent [sic] to generic entry. … Caves et al. (1991) also estimate a regression model that was quite similar to the one estimated by Grabowski and Vernon (1992) and obtained very similar results. … Note that the data suggest an upward drift in real brand- name prices. These data are consistent with the observations made by Grabowski and Vernon (1992). The figure shows a 50% rise in brand-name price five years after generic entry. The trend runs counter to the notion that brand-name producers engage in vigorous price competition with generic entrants."). *See also*, e.g., Yi Qian, "Brand Management and Strategies Against Counterfeits", *Journal of Economics & Management Strategy 23*, No. 2 (2014), 317–343 ("First, segmentation of customers into purchasing high-end brand and low-end counterfeits could imply that the brand could reoptimize to a higher price for the high-valuation consumers (Frank and Salkevers [sic], 1997); second, the brand charges a higher price to signal quality so as to separate from the counterfeits.").

623 *See*, e.g., ¶ 99.b.

624 Estape (10/22/2022) Dep. Tr. 59:16-22.

[EvergreenHealth] would do business with an organization that I'm aware of that doesn't have are FDA clearance, at least not knowingly."[625] Similarly, Edward Harrich, director of surgical services at Pullman Regional Hospital, testified that "we like to stay with FDA approval on everything we're using and doing […]."[626] Professor Elhauge also acknowledges that some hospitals had concerns about resets without FDA clearance.[627] The fact that Restore continued to pursue 510(k) clearance even though it allegedly did not think it "needed" it, indicates that FDA clearance is important from a hospital demand perspective.[628] However, Professor Elhauge conducts no analysis to assess the extent to which any hospitals would purchase reset EndoWrists from third parties without FDA clearance in the but-for world.

246. As a final note in this section, I understand that Iconocare obtained FDA clearance for one S/Si instrument in September 2022.[629] I am not aware of any evidence that Intuitive delayed Iconocare's achievement of FDA clearance or that Intuitive has hindered Iconocare from sales of resets for the EndoWrist instrument that was cleared. Therefore, damages in connection with sales of a cleared reset EndoWrist instrument should be zero.

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[625] Donovan (in *Rebotix*) Dep. Tr. 132:7-11.

[626] Harrich (in *Rebotix*) Dep. Tr. 154:5-19.

[627] Elhauge Report, ¶¶ 293, 300.

[628] Elhauge Report, ¶ 287. *See also* fn. 289 (for surgeons' perspective).

[629] Foreman Report, § IV.B, and more specifically, § IV.B.3.a).
Letter from U.S. FDA to Rick Ferreira at Iconocare Health Re: K210478 dated 11/15/2022, accessed January 6, 2023, available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf with attached FDA letter dated 9/30/2022 ("We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce….You may, therefore, market the device, subject to the general controls provisions of the Act."). *See* ¶ 53 above.

2. Professor Elhauge's purported damages calculations suffer from methodological and computational flaws

247. Professor Elhauge's start date of May 21, 2017 for his damages calculations is not supported by evidence in the case.[630] Professor Elhauge presents damages assuming a start date of May 21, 2017, which is a week before the Lexmark ruling was decided.[631] He claims that the Lexmark ruling "mooted" Rebotix's concerns and "thus would not have deterred entry after that time."[632] However, Professor Elhauge does not present evidence that Rebotix had the infrastructure in place to begin selling reset EndoWrist instruments in the U.S. immediately following the Lexmark decision. Evidence indicates that Rebotix "re-examined" selling reset EndoWrists following the Lexmark decision, and Rebotix Repair LLC was opened in 2019.[633] There is no indication that Rebotix Panama—which preceded Rebotix Repair LLC—had plans to sell reset EndoWrists to the U.S.[634] Evidence also indicates that Restore's interest in reset EndoWrists was "sparked" after a meeting between Mr. Parker and Mr. May in April 2018, and Restore as a company was formed in July 2018.[635] Moreover, setting aside the timing when third-party companies would be positioned to sell reset EndoWrists in the U.S., Professor Elhauge does not analyze how quickly hospitals and surgeons would have been willing to purchase and use reset EndoWrists, assuming that they would been at all.[636] For these reasons, Professor Elhauge's assumption that any price discount and/or increase in the use limit would occur on May 21, 2017 is unreliable and overly aggressive.[637]

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630 The same concepts apply to Professor Elhauge's assumption to calculate damages for da Vinci service beginning on May 21, 2017.

631 "High Court Reins In Patent Owners' Post-Sale Power," Ryan Davis Law360.com, May 30, 2017, accessed on January 20, 2023, https://www.law360.com/articles/914742.

632 Elhauge Report, ¶ 307.

633 REBOTIX174692 at -695.

634 Rebotix personnel closed Rebotix Panama in 2018 when it decided to "kick off the US and put all our concentration on it." *See* Papit (in *Rebotix*) Dep. Tr. 51:3-52:8.

635 Parker (in *Restore*) 27:3-18 and 9:18-20.

636 *See*, e.g., ¶ 245 above.

637 In the remainder of this section, I present results based on Professor Elhauage's damages analysis that begins on 7/11/2018 for sales of EndoWrist instruments or 1/14/2019 for sales

248. Professor Elhauge applies a 20 percent price discount and an increased use limit of 20 to both S/Si and X/Xi model instruments in his damages calculations.[638] His basis for including damages for X/Xi is that in the absence of the challenged conduct, third parties would have had a stronger incentive to develop a workaround for X/Xi EndoWrist counters, and claims by third parties that they likely would have done so. However, evidence indicates that third parties have *not* yet developed a process for resetting X/Xi EndoWrist instruments.[639] Hence, it is unclear when or if third parties would have developed a way to reset X/Xi EndoWrists in the relevant but-for world. Had third parties been unable to reset X/Xi EndoWrists, there is no basis for damages related to their sales.

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of da Vinci servicing. I have included results of my analysis with a start of 5/21/2017 in my workpapers; *see* Adjusted Damages.xlsx.

[638] Professor Elhauge presumably relies on Restore's and Rebotix's unsupported claims that they would have developed a way to circumvent the design of X/Xi instruments if Intuitive had not enforced the terms of its customer contracts. *See* Elhauge Report, ¶¶ 273, 275-276.

[639] [redacted]

249. In addition to excluding X/Xi EndoWrist instruments, I also exclude S/Si instrument models for which resets have not been available from third parties.[640] Professor Elhauge does not explain why pricing for an instrument that third parties do not reset would differ in his assumed but-for world where Intuitive lowers prices in response to competitive pressure from third parties.

250. With regard to extended use limits, Professor Elhauge claims that Intuitive's documents provide a basis to calculate the amount by which use limits would have increased in his assumed but-for world.[641] In adjusting the use limits, Professor Elhauge implicitly assumes that Intuitive's use limits are not justified by safety concerns.[642] Instead, he speculates that use limits could be uniformly set to 20 in the but-for world.[643] To arrive at this conclusion, Professor Elhauge ignores evidence on instrument use limits from Intuitive's actual Extended Use Program. For example, evidence shows that even after significant testing to improve the instruments, Intuitive was only able to increase use limits for a subset of X/Xi instruments to 12 to 18 uses.[644]

251. Professor Elhauge postulates that Intuitive would be incentivized to give a 20 percent price discount *and* double its use limits in the but-for world for his "combined damages" calculations. Again, understanding Intuitive's combined pricing/use limit strategy requires a detailed

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640 *See* REBOTIX162208, SIS001637, and Restore-00000003. For example Professor Elhauge's damages analysis includes 428090 (Single-Site 5 mm "Permanent Cautery (hook)"), which is not on the third parties' pricing schedules for reset EndoWrists. Intuitive-00279923 at -941.

641 Elhauge Report, ¶ 405.

642 Elhauge Report, ¶ 405.

643 Elhauge Report, ¶ 405.

644 Intuitive 2021 Form 10-K at p. 8. ("In 2020, [Intuitive] we announced our "Extended Use Program," which consists of select da Vinci Xi and da Vinci X instruments possessing 12 to 18 uses …, compared to previously 10 uses. These Extended Use instruments represent some of our higher volume instruments but exclude stapling, monopolar, and advanced energy instruments."). Intuitive-00004692 ("Extended Use White Paper") at -692 ("Based on a number of design and manufacturing improvements made over the past several years….a number of X/Xi instrument shave been re-evaluated for extended life reliability."). *See also,* DeSantis (in *Restore*) Dep. Tr. 64:10-22 ("Q. … Okay. And do you have any idea about the -- the -- cost of running the testing for the Xi extended lives program? A. Just the testing part of it? Q. Yes. A. I can give a general ballpark. It's significant. It -- it takes -- We go through the whole life test to go through the whole BNV; and it takes a lot of time, so you know.").

economic analysis, which Professor Elhauge has not provided. More specifically, in Professor Elhauge's posited but-for world, lower price levels and higher use limits are strategic substitutes—i.e., Intuitive can offer hospitals greater value either by lowering price or by extending use limits.[645] This means that Intuitive likely would reduce the magnitude of any price discount if it was forced or induced to extend EndoWrist use limits, and the extent to which the magnitude of any price discounts would be reduced depends on hospitals' willingness to trade off price discounts for extended uses.

252. That Professor Elhauge ignores these relevant economics is reflected in the size of the effective price reductions assumed in his "combined damages" calculation. Professor Elhauge's purported "combined damages" is equivalent to an effective 55.4 percent discount on Intuitive's prices.[646] The effective 55.4 percent discount exceeds Professor Elhauge's "benchmarks" when he considers but-for world price discounts. Setting aside the merits of his "benchmarks," Professor Elhauge referenced discounts ranging from 20 percent to 45 percent, where 45 percent corresponded to the "average price offered by actual entrants Restore, SIS, and Rebotix…"[647] Notably, an effective discount of 55.4 percent exceeds even the upper end of this range.

253. Table 3 summarizes the impact on Professor Elhauge's purported damages after accounting for instruments that third parties do not or have not reset. The exclusion of these instruments reduces damages under Professor Elhauge's "combined" scenario to $364 million, which is 21 percent of Professor Elhauge's damages estimate as presented in his report.

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[645] Intuitive-00559776 ("Q&A for Extended Use Program and Q2") at -777 ("The price per *instrument* of our longer-lived instruments will be higher than the previous shorter-lived instruments reflecting the significant investments we have made in developing these instruments – however, from a customer perspective, the *price per use* of these instruments will be lower."). As part of its Extended Use Program, Intuitive also introduced four instruments with the "same [number of] uses but reduced pricing." *See* Intuitive-00560028 at -038.

[646] *See* Table 3 below.

[647] *See* Elhauge Report, ¶¶ 351-356 and Table 3. Professor Elhauge includes Rebotix's sales to distributors in his calculation of the volume-weighted average price discount offered by third parties. This inflates the average price discount as distributors typically pay a much lower price for reset instruments than hospitals. When I exclude Rebotix's sales to distributors, the average price discount is reduced from 45 percent to 40 percent.

TABLE 3 PROFESSOR ELHAUGE'S QUANTIFICATION OF PURPORTED DAMAGES RELATED TO THE SALE AND RESET OF ENDOWRISTS ADJUSTED: BUT-FOR ENTRY 7/11/2018

			Purported Damages		
		Net Sales	Price Effect	Use Limit	Combined
		[1]	[2]	[3]	[4]
Professor Elhauge's Purported Damages (All S/Si and X/Xi EndoWrist Instrument Models)					
Valley Medical Center	[A]	2,287,295	457,459	1,022,722	1,275,637
Franciscan Health	[B]	7,767,685	1,553,537	3,411,723	4,282,916
Larkin Community Hospital	[C]	711,600	142,320	353,550	425,160
Classwide	[D]	3,155,130,010	631,026,000	1,396,401,673	1,748,147,339
Effective Price Discount	[E]		20.0%	44.3%	55.4%
EndoWrist Instrument Models Included in Third-Party Pricing Sheets					
Valley Medical Center	[F]	88,400	17,680	44,200	53,040
Franciscan Health	[G]	1,154,300	230,860	577,150	692,580
Larkin Community Hospital	[H]	321,300	64,260	158,400	190,980
Classwide	[I]	607,466,494	121,493,297	303,424,086	364,232,565
Classwide Damages as % of Elhauge Total	[J]		19.3%	21.7%	20.8%

Sources and Notes:

EndoWrist Instrument Models Included in Third-Party Pricing Sheets (SIS001637,REBOTIX162208, Restore-00000003). All values in US dollars. Note that the upper panel reflects Professor Elhauge's damages calculations shown in Table 5, Corrected Table 6, and Corrected Table 7 but not Corrected Table 9, as there are inconsistencies presented in Professor Elhauge's damages across different tables.

[E]: [D] / [D][1].

[J]: [I] / [D].

B. PROFESSOR ELHAUGE'S PURPORTED DAMAGES RELATED TO DA VINCI SYSTEM SERVICING

254. Professor Elhauge's quantification of purported damages related to system servicing assumes that third-parties would have "created competitive pressure requiring Intuitive to lower its own prices for da Vinci service" in the but-for world.[648] Professor Elhauge uses Abbott Laboratories' medical equipment repair and maintenance services margin as a "yardstick" for Intuitive's services margin and calculates that da Vinci servicing prices would have to be discounted by 24

[648] Elhauge Report, ¶ 413.

percent in the but-for world.[649] He then applies this price discount of 24 percent to the total dollar amount of da Vinci services sold and finds that damages from higher servicing prices to all proposed class members are $494 million if entry occurs on May 21, 2017 (the beginning of the Class Period) and $350 million if entry occurs on January 14, 2019 (the date da Vinci servicing was first sold by Restore).[650]

255. Professor Elhauge provides no analysis of the demand for da Vinci servicing and Intuitive's competitive response in his asserted but-for world. Even with close to 20 thousand companies estimated to be in the business of used medical devices servicing in the U.S., only 30 to 35 percent of repairs in the U.S. are done by third-party repair companies, according to Clif Parker at Restore.[651] Notably, the demand for Restore's da Vinci System servicing was much smaller relative to the demand for its EndoWrist resets, indicating a lack of demand for third-party da Vinci services.[652] Furthermore, evidence indicates that the system "servicing" that has been performed by Restore suffered from substandard quality.[653] Without assessing the competitive impact of Intuitive's potential rivals for da Vinci servicing, Professor Elhauge speculates that Intuitive would reduce its servicing prices due to entry and applies a blanket price discount of 24 percent to all da Vinci servicing revenues.

256. As explained in Section III, Professor Elhauge's entire approach to damages is unreliable because he ignores interdependence in demand of the components of Intuitive's surgical system. Moreover, as discussed above, unbundling the components of the da Vinci Surgical System would incentivize Intuitive to change its pricing strategy to achieve as much system integration as possible; for example, Intuitive may lower prices on system servicing and raise the price of

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649 Elhauge Report, ¶413. *See also* Elhauge Report, fn. 970.

650 Elhauge Report, ¶¶ 415-416.

651 Parker (10/25/2022) Dep. Tr. at 161:25-162:4. Moreover, as I discussed in Section VII, an IBIS World report estimate shows that independent service organizations only account for around 25 percent of medical repair and maintenance revenue in 2021, despite the fact that they typically charge lower prices than original equipment manufacturers.

652 Expert Report of Loren K. Smith, Ph.D., Restore Robotics LLC and Restore Robotics Repair LLC v. Intuitive Surgical, Inc., Case No. 5:19-cv-55, August 20, 2021, ¶ 27 and Table 1.

653 *See* ¶ 203.

the da Vinci platform, which likely would decrease demand for the da Vinci Surgical System and thus system servicing relative to the expected actual world.[654] This could greatly reduce damages or even turn them negative.

257. In addition, Professor Elhauge states that there are da Vinci services that are proprietary to Intuitive and are "incontestable" in the sense that they could not be provided by third-party companies.[655] Professor Elhauge posits that because Intuitive charges the same hourly rate for both contestable and incontestable services (for Time & Material customers not enrolled in a service plan), third-party companies offering contestable services would drive down the prices for both.[656] Again, Professor Elhauge provides little support for relying on this assumption. For example, he does not assess what proportion of Intuitive's system servicing revenues (or margins) might be attributable to contestable services. In the relevant but-for world Intuitive could, and likely would, unbundle its contestable and incontestable services, and thus if Professor Elhauge's characterization of system servicing markets is correct, economic principles dictate that Intuitive would be incentivized to increase the price of "incontestable" services, in which case Professor Elhauge's purported damages would be reduced or even eliminated.

258. Professor Elhauge does not consider any of these plausible responses by Intuitive in his posited but-for world. Moreover, to support his claim that Intuitive would lower its rate for "incontestable" and "contestable" services in the but-for-world, Professor Elhauge cites to a "uniform hourly rate" for Time & Material customers in Intuitive's "2019 US Billable Services Rates."[657] Given that servicing revenue from Time & Material customers has accounted for no more than about 1.3 percent of Intuitive's servicing sales in the U.S. since 2017, Professor Elhauge does not provide support as to why his use of this rate schedule to make assessments

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654 *See* Section VI.D above.

655 Elhauge Report, ¶ 223 and fn. 973.

656 Elhauge Report, fn. 973.

657 Elhauge Report, ¶ 225 (citing to Intuitive-00154125).

about service plan pricing for the vast majority of its customers in his envisioned but-for-world would be appropriate.[658]

259. Professor Elhauge computes damages related to the servicing of S, Si, X, and Xi platforms.[659] However, it's not clear that Restore, the only company to perform da Vinci servicing, ever serviced any X or Xi da Vinci Surgical Systems.[660] Professor Elhauge justifies his inclusion of the X/Xi systems in his servicing damages based on the "logical" conclusion that "in a but-for world with unrestrained rival repair of X/Xi-compatible EndoWrists, rivals would also provide X/Xi servicing."[661] However, based on Professor Elhauge's logic, given that third parties have not be able to commercialize reset X/Xi EndoWrist instruments, third parties also would not be able to provide X/Xi servicing.[662] Professor Elhauge states that he is "unaware of any technical barriers to do servicing on the da Vinci S, X, and Xi relative to the da Vinci Si," but he provides no evidence as to why it is reasonable to assume that, given the "advances in the technology" of da Vinci Xi System relative to the da Vinci Si System, third parties would be able to service da Vinci X/Xi Systems.[663]

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[658] Intuitive-02072145.

[659] Elhauge Report, ¶ 416.

[660] Elhauge Report, fn. 976. *See also,* Gordon (in *Restore*) Depo. Tr. 102:8-21 ("Q. What models of da Vinci surgical robots did you do this work on? A. I believe it was just IS3000. There may -- Q. And is that -- A. -- have been an IS2000 in there somewhere, but I don't recall. I believe it was just the Si's. Q. The Si's. Okay. Have you ever heard of the Xi? A. I have. Q. Or the -- have you ever performed preventative maintenance or repairs on an X or Xi? A. I have not.").

[661] Elhauge Report, fn. 976.

[662] *See* ¶ 248 (that third parties have not commercialized reset X/Xi EndoWrists).

[663] Elhauge Report, fn. 976; Burke (9/27/2022) Dep. Tr. 59:5-13 ("Q. You said earlier that you were advocating for the purchase of an Xi; correct? A. Yes. Q. Why did you want the hospital to purchase an Xi? A. At that time, I thought that the advances in the technology had improved enough to warrant another robot, plus we had -- our Si was probably the oldest one in the State of Washington.")

[664] Elhauge Report, ¶ 416.

serviced any X or Xi da Vinci Surgical Systems.[665] Professor Elhauge justifies his inclusion of the X/Xi systems in his servicing damages based on the "logical" conclusion that "in a but-for world with unrestrained rival repair of X/Xi-compatible EndoWrists, rivals would also provide X/Xi servicing."[666] However, based on Professor Elhauge's logic, given that third parties have not been able to commercialize reset X/Xi EndoWrist instruments, third parties also would not be able to provide X/Xi servicing.[667] Professor Elhauge states that he is "unaware of any technical barriers to do servicing on the da Vinci S, X, and Xi relative to the da Vinci Si" but provides no evidence as to why it is reasonable to assume that, given the "advances in the technology" of da Vinci Xi System relative to the da Vinci Si System, third parties would be able to service da Vinci X/Xi Systems.[668]

261. Setting aside these larger conceptual issues, Professor Elhauge's use of Abbott Laboratory's EBIT profit margin for services as a yardstick for Intuitive's EBIT profit margin in the but-for world is inappropriate for the following reasons.[669]

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[665] Elhauge Report, fn. 976. *See also,* Gordon (in *Restore*) Depo. Tr. 102:8-21 ("Q. What models of da Vinci surgical robots did you do this work on? A. I believe it was just IS3000. There may -- Q. And is that -- A. -- have been an IS2000 in there somewhere, but I don't recall. I believe it was just the Si's. Q. The Si's. Okay. Have you ever heard of the Xi? A. I have. Q. Or the -- have you ever performed preventative maintenance or repairs on an X or Xi? A. I have not.").

[666] Elhauge Report, fn. 976.

[667] *See* ¶ 248 (that third parties have not commercialized reset X/Xi EndoWrists).

[668] Elhauge Report, fn. 976; Burke (9/27/2022) Dep. Tr. 59:5-13 ("Q. You said earlier that you were advocating for the purchase of an Xi; correct? A. Yes. Q. Why did you want the hospital to purchase an Xi? A. At that time, I thought that the advances in the technology had improved enough to warrant another robot, plus we had -- our Si was probably the oldest one in the State of Washington.")

[669] Elhauge Report, ¶ 413. Note that Professor Elhauge relies on Abbott's EBIT for servicing as reported by IBISWorld. *See* Elhauge Report, ¶¶ 366 and 413. However, Abbott does not report such a metric in its public filings, and IBISWorld does not provide any details on how it may have calculated or estimated its reported service-specific EBIT for Abbott. Professor Elhauge does not demonstrate that the specific measurement he uses is an accurate reflection of Abbott's actual service unit performance.

262. First, it is widely known to economists that economic profit margin, not EBIT profit margin, is a more relevant "yardstick" to compare between firms that sell similar goods or services.[670] For instance, in a perfectly competitive industry, entry or the threat of potential entry will drive economic profits, but not necessarily accounting profits, down to zero in the long-run equilibrium.[671] Moreover, due to a variety of factors, such as the imputation of fixed costs, intertemporal allocation of R&D expenses, interproduct allocation of marketing expenses, etc., a company's accounting profit margin in published financials often fails to accurately reflect its true economic profit margin.[672] Professor Elhauge's comparison does not account for these potential factors.

263. Second, Professor Elhauge's calculation of damages assumes that Intuitive and Abbott Laboratories are comparable companies with respect to their service operations. He asserts that this is because "Abbott is also a medical device OEM and is the firm most similar to Intuitive in terms of size within this medical equipment repair and maintenance service industry."[673] Yet, the two companies differ considerably in size. In 2021, Abbott's total company revenue is nearly 8 times as large as Intuitive's total revenue, while Intuitive's servicing revenue doubles Abbott's

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[670] Franklin M. Fisher, and John J. McGowan, "On the misuse of accounting rates of return to infer monopoly profits," *American Economic Review*, Vol. 73, No. 1 (March 1983), p. 82. "[I]t is clear that it is the economic rate of return that is equalized within an industry in long-run industry competitive equilibrium and (after adjustment for risk) equalized everywhere in a competitive economy in long-run equilibrium. It is an economic rate of return (after risk adjustment) above the cost of capital that promotes expansion under competition and is produced by output restriction under monopoly. Thus, the economic rate of return is the only correct measure of the profit rate for purposes of economic analysis. Accounting rates of return are useful only insofar as they yield information as to economic rates of return."

[671] Carlton and Perloff, at p. 86: "In long-run equilibrium, firms receive economic profits of zero, which is just enough to induce them to stay in the market."

[672] Peter Davis and Eliana Garces, *Quantitative Techniques for Competition and Antitrust Analysis* (Princeton University Press, 2010), p. 298 ("Margin and profitability figures taken from published accounting documents often include imputations of fixed costs and estimation of depreciation that may not bear much relation to the economic concepts used to calculate economic costs. Also, accounting profits may be subject to intertemporal or interproduct allocations of revenues and expenses that do not correspond to meaningful economic concepts.")

[673] Elhauge Report, ¶ 413.

servicing revenue.[674] There are also marked distinctions between the two companies such that one would not expect their cost structure or financial metrics to be comparable. For example, Abbott's principal medical devices are for the treatment of cardiovascular diseases, diabetes care products, and neuromodulation devices for the management of chronic pain and movement disorders, while Intuitive's services are limited to its own da Vinci Surgical Systems.[675]

264. Even if Professor Elhauge's purported EBIT profit margin for servicing for Abbott is an appropriate yardstick (which as I explained above, it is not), Professor Elhauge's calculation of Intuitive's EBIT profit margin for servicing and but-for service price suffers from several methodological flaws that render his estimation of damages related to da Vinci servicing unreliable.

265. First, Professor Elhauge compares the average product cost margin for service over 2017-2020 from an internal Intuitive document with Abbott's gross profit margin, while Intuitive reports significantly lower gross profit for services in its public filings.[676] Professor Elhauge does not explain why he selects the larger product cost margin that leads to larger servicing damages. Replacing the average product cost margin with Intuitive's actual gross margin for service

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[674] Curran at p. 29; Abbott Form 10-K for the Fiscal Year Ended December 31, 2021 (Abbott 2021 Form 10-K) at p.50; Intuitive Form 10-K For the fiscal year ended December 31, 2021 at p. 84.

[675] Abbott's principal medical devices are rhythm management, electrophysiology, heart failure, vascular and structural heart devices for the treatment of cardiovascular diseases, and diabetes care products for people with diabetes, as well as neuromodulation devices for the management of chronic pain and movement disorders. *See* Abbott 2021 Form 10-K at p. 3.

[676] As reported in Intuitive's 10-Ks, its gross profit margin for services is 68.6% in 2021, 63.1% in 2020, 65.6% in 2019, 66.3% in 2018, and 68.6% in 2017. These numbers are significantly lower than Professor Elhauge's average product cost margin of 87% for years 2017-2020. Elhauge Report, ¶ 366. Intuitive-00595405, tab CM-SERVICE. The gross profit margin for services = (revenue for service – cost of revenue for service) / revenue for service. In 2021, Intuitive's revenue for service was 916.2 million, and Intuitive's cost of revenue for service was 287.5 million. 68.6% = (916.2 - 287.5) / 916.2. The same calculation method is used to calculate the gross profit margin in 2017-2020. 2020: 63.1% = (723.8 - 266.9) / 723.8. 2019: 65.6% = (724.2 – 249.2) / 724.2. 2018: 66.3% = (635.1 – 213.9)/ 635.1. 2017: 68.6% = (572.9 – 179.9) / 572.9 *See* Intuitive 2021 Form 10-K at p. 84. *See* also Intuitive Surgical Form 10-K For the Fiscal Year Ended December 31, 2018 at p. 64.

reduces Intuitive's EBIT profit margin for services from 42 percent to 33 percent and the but-for service price discount from 24 percent to 12 percent.[677]

266. Second, because "Intuitive does not report EBIT profit margins just for service," Professor Elhauge multiplies the 2017-2020 average product cost margin for services by a ratio of EBIT over gross profit for *all products and services* in 2021 to estimate Intuitive's EBIT profit margin for services.[678] Professor Elhauge provides no support as to why Intuitive's EBIT specific to servicing, which accounts for only 16 percent of Intuitive's total gross profit in 2021, would be proportional to its overall EBIT. [679]

267. Finally, Professor Elhauge does not rely on the correct servicing contracts or processing instructions as indicated by Intuitive. Specifically, Professor Elhauge's corrected damages relies partially on out-of-date data and does not fully impute sales using the annual price field as instructed by Intuitive.[680] In Table 4 below, I adjust Professor Elhauge's quantification of service damages by (1) adjusting the service price discount, (2) adjusting the servicing data used in Professor Elhauge's calculations, and (3) limiting the servicing damages to S/Si platform. This reduces purported classwide damages related to da Vinci System servicing to 15.9 percent of Professor Elhauge's estimates.

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[677] Intuitive's EBIT profit margin for services = 68.6% (Intuitive's gross profit margin for services in 2021) × 0.48 (the ratio of EBIT over gross profit for *all products and services* in 2021) = 33%. Service price discount = (1-0.33)/(1-0.24)-1=-0.12, or a 12% price drop.

[678] Elhauge Report, ¶ 366.

[679] Elhauge Report, ¶ 366 and fn. 883. Intuitive's gross profit for services in 2021 = $916.2 million - $287.5 million = $628.7 million; Intuitive's total gross profit in 2021 = $3958.5 million. It follows that the gross profit of service is only 16% of Intuitive's total gross profit in 2021. *See* Intuitive 2021 Form 10-K at p. 84.

[680] Elhauge relies on Intuitive-00000316.xlsm, Intuitive-00706089.xlsx, and Intuitive-00695236.xlsx, and furthermore relies on the net value field when populated for servicing net revenues. Intuitive's responses to plaintiffs' data-questions explain that servicing net revenues should be calculated strictly from the annual price field in Intuitive-00695236 and Intuitive-02072147. *See* Intuitive's Responses to Plaintiffs' Second Follow-Up Data Questions on Intuitive's Responses, response to question 8.

TABLE 4 ELHAUGE PURPORTED SERVICE DAMAGES ADJUSTED: BUT-FOR ENTRY 1/14/2019

		Elhauge Service Damages	Adjusted Price Discount Based on Comparable Margin	Adjusted Servicing Sales Revenue	Adjusted to S/Si Platform Revenue	Adjusted Price Discount + Adjusted Revenue + Adjusted Platform
		[1]	[2]	[3]	[4]	[5]
Valley Medical Center	[A]	281,331	137,704	172,464	43,176	21,134
Franciscan Health	[B]	1,392,735	681,707	1,455,407	528,595	258,733
Larkin Community Hospital	[C]	65,894	32,254	18,210	9,105	4,457
Classwide	[D]	349,574,656	171,107,590	299,853,991	113,525,344	55,567,669
Classwide Damages as % of Elhauge Total	[E]		48.9%	85.8%	32.5%	15.9%

Sources and Notes:

All values in US dollars.

[1]: Reflects Professor Elhauge's damage calculations shown in Corrected Table 9 of Elhauge Report but not Table 8, as there are inconsistencies presented in Professor Elhauge's damages across different tables.

[2]: Uses the same service sales numbers Professor Elhauge uses but applied with the adjusted margin of ~12%.

[3]: Uses the same margin of 24% that Professor Elhauge applied but using adjusted data as provided by Intuitive's data response, Intuitive-00695236 and Intuitive-02072147.

[4]: Uses the same margin of 24% that Professor Elhauge applied but using adjusted data as provided by Intuitive's data response, Intuitive-00695236 and Intuitive-02072147 and only included S/Si service revenue.

[5]: Uses the adjusted margin of ~12% and the adjusted data as provided by Intuitive's data response, Intuitive-00695236 and Intuitive-02072147 and only included S/Si service revenue.

[E]: [D] / [D][1].

268. In Table 5, I adjust Professor Elhauge's purported total damages to each of the three Named Plaintiffs and all proposed class members. For damages related to the sale of EndoWrists, I limit to instruments that are included in third-party pricing sheets. For damages related to da Vinci System servicing, I adjust Professor Elhauge's servicing margin calculation, his servicing data processing, and limit to S/Si platform servicing revenues. Setting aside the conceptual flaws in Professor Elhauge's damages analysis, I find that adjusting for these computational and methodological errors alone reduces the total purported classwide damages to approximately 20 percent of Professor Elhauge's purported damages.

TABLE 5 ELHAUGE PURPORTED TOTAL DAMAGES ADJUSTED: BUT-FOR ENTRY 7/11/2018 FOR ENDOWRIST SALES AND 1/14/2019 FOR DA VINCI SERVICE

		Adjusted Damages				
		EndoWrist Sales				
	Elhauge Total Damages	Price Effect	Use Limit	Combined	Service	Total
	[1]	[2]	[3]	[4]	[5]	[6]
Valley Medical Center	1,556,968	17,680	44,200	53,040	21,134	74,174
Franciscan Health	5,675,651	230,860	577,150	692,580	258,733	951,313
Larkin Community Hospital	491,054	64,260	158,400	190,980	4,457	195,437
Classwide	2,097,721,995	121,493,297	303,424,086	364,232,565	55,567,669	419,800,234

Sources and Notes:

All values in US dollars.

[1]: Reflects servicing damage shown in Corrected Table 9 and repair and replacement damages shown in Corrected Table 7 of Elhauge Report. There are inconsistencies presented in Professor Elhauge's damages across different tables.

269. Lastly, Professor Elhauge asserts that, assuming Intuitive's volume of sales remains the same or higher in later years, the proposed class will continue to suffer at least $586 million ($125 million from da Vinci servicing and $461 million for EndoWrists) in harm annually.[681] These estimates are based on his purported damages in 2021 that are largely related to X/Xi instruments and X/Xi platform services that no third party has yet been able to provide. After excluding instrument sales and platform services related to X/Xi and implementing the adjustments I detail above, Professor Elhauge's purported total classwide damages in 2021 is reduced to $49 million ($14 million from da Vinci servicing and $35 million for EndoWrists). Further, due to the increasing share of X/Xi related instrument sales and servicing revenues over time, future annual damages would likely be even lower than the adjusted classwide damages of $49 million.

[681] Elhauge Report, ¶ 418.

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January 20, 2023

APPENDIX A. DATA PREPARATION AND SUPPLEMENTAL ANALYSES

1. This appendix describes the data sources used in preparing the substitution and pricing analyses in my Report. It also provides supplemental analyses related to substitution and pricing.

A. DATA SOURCES FOR SUBSTITUTION AND PRICING ANALYSES

1. Intuitive's System Sales Transactions Data

2. I use data provided by Intuitive covering its worldwide da Vinci platform transactions from January 2012 through December 2021.[1] Below, I list the fields relevant for my analysis as well as my understanding of these fields:[2]

- Period Qtr: year and quarter of transaction
- Company Code: selling legal entity
- Country: country of transaction
- Lease Type Description: description of lease if transaction is a lease
- Transaction Category: category of transaction

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[1] 2012-2013 System Transactional Data - Intuitive-00695237, 13Q3 - Intuitive-00595463, 13Q4 - Intuitive-00595462, 14Q1 - Intuitive-00595458, 14Q2 - Intuitive-00595459, 14Q3 - Intuitive-00595460, 14Q4 - Intuitive-00595461, 15Q1 - Intuitive-00595454, 15Q2 - Intuitive-00595455, 15Q3 - Intuitive-00595456, 15Q4 - Intuitive-00595457, 16Q1 - Intuitive-00595450, 16Q2 - Intuitive-00595451, 16Q3 - Intuitive-00595452, 16Q4 - Intuitive-00595453, 17Q1 - Intuitive-00595446, 17Q2 - Intuitive-00595447, 17Q3 - Intuitive-00595448, 17Q4 - Intuitive-00595449, 18Q1 - Intuitive-00595442, 18Q2 - Intuitive-00595443, 18Q3 - Intuitive-00595444, 18Q4 - Intuitive-00595445, 19Q1 - Intuitive-00595441, 19Q2 - Intuitive-00595440, 19Q3 - Intuitive-00595439, 19Q4 - Intuitive-00595438, 20Q1 - Intuitive-00595433, 20Q2 - Intuitive-00595432, 20Q3 - Intuitive-00595431, 20Q4 - Intuitive-00595430, 21Q1 - Intuitive-00595429, Intuitive-00849019.xlsx.

[2] For a discussion of the Systems data fields *see* Intuitive Surgical, Inc. Responses to Restore's Data Questions, July 10, 2021, at pp. 1-4; Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at pp. 2-6; Intuitive Surgical, Inc. Intuitive's Responses to Class Plaintiffs' Second Follow-Up Data Questions, at pp. 1-2.

- Trade In System Type: type of system if transaction is a trade in
- No of Trade In Systems: number of trade in systems if transaction is a trade in
- System Name: name of system
- System Type: type of system (e.g. "System", "Simulator", "Loaner", "Upgrade", etc.)
- Total System Revenue (USD): total system revenue in USD
- Total System Qty: total system quantity

2. Intuitive's Instruments & Accessories Sales Transactions Data

3. I use data produced by Intuitive that cover all worldwide sales for instruments and accessories ("I&A") from January 2012 through December 2021.[3] Below, I list the main fields as well as my understanding of them:

- Posting Date: "date of data referenced"[4]
- Comp Code: "selling legal entity"[5]
- Customer: "Code identifying [a] specific customer"[6]
- Customer Name: text field corresponding to the customer code[7]

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[3] Intuitive-00695234, Intuitive-00695144, Intuitive-00595436, Intuitive-00595435, Intuitive-00595434, Intuitive-00595406, Intuitive-00595407, Intuitive-00595408, Intuitive-00595409, Intuitive-00595410, Intuitive-00595411, Intuitive-00595412, Intuitive-00595413, Intuitive-00695233, Intuitive-00595415, Intuitive-00595416, Intuitive-00595417, Intuitive-00595418, Intuitive-00595419, Intuitive-00595420, Intuitive-00595421, Intuitive-00595422, Intuitive-00595423, Intuitive-00595424, Intuitive-00595425, Intuitive-00595426, Intuitive-00595427, Intuitive-00695232, Intuitive-00595428, Intuitive-00701322, Intuitive-00706090; Intuitive Surgical, Inc. Responses to Rebotix Repair, LLC's Data Questions, July 10, 2021.

[4] Intuitive Surgical, Inc. Responses to Rebotix Repair, LLC's Data Questions, July 10, 2021, at p. 2.

[5] *Id.*

[6] *Id.*

[7] *Id.*

- Ship-to Party: "Code identifying shipping information"[8]
- Ship-to Party Name: "Customer name or identifying code"[9]
- Product: "Code identifying the product sold"[10]
- Material Description: text field that "[i]dentifies product sold,"[11] e.g., "STAPLER,SUREFORM 60,SPU,BOX OF 6,IS4000"
- Sales Qty: quantity sold[12]
- Unit: values include "BOX," "EA," "FT," "ROL," and "USE"[13]
- Currency: currency in which customer paid[14]
- Net Sales: "Total net sales, subtracting discounts from gross sales"[15]
- Net Price per Qty: "Net sales by currency divided by the quantity of product sold (i.e., the value in the field 'Net Sales by Curr' divided by the value in the field 'Sales Qty')"[16]

4. Sales records with negative values can represent returns, credits, or other adjustments such as rebates.[17] Sales records with Sales Qty equal to zero pertain to "adjustments separate from a sale, such as rebates or contractual credit memos."[18]

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8 *Id.*
9 *Id.*
10 *Id.*
11 *Id.*
12 *Id.*
13 *Id.*
14 *Id.* at p. 3.
15 *Id.*
16 *Id.*
17 *Id.* at p. 4.
18 *Id.*

5. I incorporate additional descriptive information for each instrument into the I&A transaction data using the "product map" file produced by Intuitive.[19] This file includes the following main fields:

- Material Num: "Code identifying specific product"[20]
- Base Material: "Code identifying type of product"[21]
- Material Name: "Name of specific product"[22]
- Product Platform: "Identifies which da Vinci model is used"[23]
- Base UOM: "Base unit of measure, (e.g., box, each, or number of uses)"[24]
- Number Of Uses (if Each) or Qty per Box (if Box): "Number of uses for product serviced if reusable or number of boxes of the product that is sold"[25]

3. Intuitive's da Vinci Procedures Data

6. I utilize Intuitive's data containing all worldwide "procedures performed using Intuitive's da Vinci Surgical System from January 1, 2012 through December 31, 2021"[26] ("Intuitive Procedures data").[27] Below I list the fields relevant for my analysis as well as my understanding of these fields:

- Hospital Name: Facility name
- Account ID: Facility identifier

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19 Intuitive-00701322.

20 Intuitive Surgical, Inc. Responses to Rebotix Repair, LLC's Data Questions, July 10, 2021, at p. 5.

21 *Id.*

22 *Id.*

23 *Id.*

24 *Id.* at p. 6.

25 *Id.*

26 Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 11.

27 Intuitive-00706097.

- IDN: Integrated Delivery Network identifier, i.e., health system identifier
- Country: Country
- Category: Procedure category
- Procedure Subject: Procedure Subject
- da Vinci Procedure Volume: Number of procedures performed using the da Vinci Surgical System
- System Model: System platform type
- System Name: System serial number

4. IQVIA Procedures Data

7. I use data produced by Intuitive where Intuitive routinely integrates its own data that tracks da Vinci surgical procedures at U.S. hospitals with data from IQVIA, a healthcare-focused market research vendor, which provides estimates of the specific volumes of laparoscopic and open surgery procedures at these hospitals ("IQVIA data").[28] These data cover the period from 2012 through 2021. Below I list the fields relevant for my analysis as well as my understanding of these fields:

- Account Name: Facility name
- Account ID: Facility identifier
- Current IDN: Integrated Delivery Network identified, i.e., health system identifier
- Procedure Group: Procedure group
- Category: Procedure category

[28] Intuitive-00706098. The IQVIA data does not track a small number of procedure categories where da Vinci is used, including "Cardiac" and "Head and Neck" procedures.

- Adjusted Total Volume: Total surgical volume across da Vinci, laparoscopic, and open procedures[29]
- Adjusted Open Volume: "Surgical volume for open surgeries"[30]
- da Vinci Volume: "Number of da Vinci surgical procedures"[31]
- Lap Volume: "Number of laparoscopic, non-da Vinci surgical procedures"[32]

5. Intuitive's Servicing Contracts Data

8. I utilize data produced by Intuitive containing its worldwide "historical data on service contracts dating back to 2012" ("Intuitive Contracts data").[33] Below I list the fields relevant for my analysis as well as my understanding of these fields:

- SOrg: Region code[34]
- Created On: Transaction record date
- Start date: Service start date
- End date: Service end date
- Net price: Contractual price

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29 "Adjusted Total Volume is the total surgical volume across da Vinci, laparoscopic, and open, typically provided by IQVIA. In select instances, total volume equals the da Vinci volume if the da Vinci volume is greater than the total surgical volume in IQVIA." Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 12.

30 "In select instances when the da Vinci volume exceeds the total volume for minimally invasive surgeries, open surgeries is calculated as the difference between total volume and the da Vinci volume." *Id.*

31 *Id.*

32 *Id.*

33 Intuitive-00695236, Intuitive-02072147. Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 9.

34 Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 10.

- annualPrice: "Annualized payment made for each contract"[35]
- Your Ref.: System serial number[36]
- Description: Type of service plan
- Customer: Code identifying customer

B. DATA PREPARATION

1. Linking Customers between the I&A Transactions and Procedures Data

9. When analyzing Intuitive's instrument pricing expressed per procedure, I integrate information from multiple sources identified above. To do this, I create a crosswalk between customer identifiers in the I&A Transactions data and those in the Intuitive and IQVIA Procedures data by utilizing customer information in the System Transactions data as a bridge between these datasets. Customers in the I&A Transactions data are identified by "Customer" number and "Ship to Party" number. Customers in the IQVIA and Intuitive Procedures data are identified by "Account ID", which is also referred to as the "Netsuite ID". The Systems Transactions data contains all three identifiers.

10. First, I use "Customer" in the I&A data and "Customer Number" in the Systems data to match customers between these datasets.[37] I am able to link the majority of customers using this approach. Second, I use "Ship to Party" number in the I&A and System Transactions data to match customers that are associated with leasing transactions, because these transactions are assigned a special customer number that corresponds to a leasing company and cannot be mapped to a specific hospital. Third, I add to the crosswalk some additional customer identifiers that I am not able to match through the first two steps, due to changes in the "Customer" and "Ship to Party" records over time.

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[35] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Second Follow-Up Data Questions, at p. 3.

[36] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Follow-Up Data Questions, at p. 4.

[37] Intuitive Surgical, Inc. Responses to Restore's Data Questions, July 10, 2021, at p. 4.

11. The resulting crosswalk allows me to link instrument sales to customers from the IQVIA and Intuitive Procedures data using "Netsuite ID". The matching process described above results in a customer crosswalk that captures approximately 91% of total I&A sales from Q1 2012 through Q4 2021. Customers not found in the Systems data are primarily those who purchased their system(s) prior to the period covered by the Systems data (i.e., before 2012). Similarly, the matched customers account for approximately 96% of the da Vinci procedures in IQVIA data and 94% of the da Vinci procedures in the Intuitive data.

2. Calculating Average Selling Price for a da Vinci model Xi

12. To calculate average price per system, I start with the System Transactions data from 2014 through 2021.[38] I then isolate system sales transactions and remove the following:[39]

- Transactions that occur outside of the United States
- System leases
- System trade-ins
- System upgrades
- Transactions with no system revenue and no system quantities

13. Following this filtering, I calculate the weighted average price per system as the sum of "Total System Revenue USD" over the sum of "System Qty" in a given year.[40] I do this separately for each type of console, single versus dual.

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[38] The Xi model was launched in 2014.

[39] The process for identifying new system sales versus leases follows the description provided in Intuitive Surgical, Inc. Responses to Restore's Data Questions, July 10, 2021, at p. 2.

[40] As discussed in my report, I present prices for the model Xi which accounts for 93% of system revenue during the period after applying the filtering identified above.

3. Calculating Average Instrument Prices Expressed Per Procedure and Per Use

14. My analysis of instrument pricing uses a combination of the I&A Transactions data, IQVIA Procedures data, and Intuitive Procedures data. In preparing these data for analysis, I remove the following types of instrument sales transactions from the combined dataset:

- Transactions that are recorded as "ISI REBATE PROGRAM" in the "Material Description" field;
- Transactions with zero sales quantity;
- Transactions other than instrument sales (i.e., Accessories);
- Transactions for units that are only partially used before being returned;[41]
- Transactions associated with Ion instruments; and
- Transactions associated with training instruments.[42]

15. Following this approach, I aggregate procedure totals from the hospital level to the IDN (hospital network) level to account for customers which operate as a broader hospital network having multiple hospitals that utilize the da Vinci system. I do this using either the recorded hospital IDN/network name (based on the Current IDN field) or Netsuite_ID for customers that are not identified as being part of a broader network in the data.

16. I then categorize all customers into two groups (high and low) based on their relative share of da Vinci procedures out of total surgical procedures performed by the customer across modalities in 2021, which I define as the sum of da Vinci, laparoscopic, and open procedures. Specifically, I assign a customer to a "high" group if its da Vinci share in 2021 is above the median value, and I assign them to a "low" group if their da Vinci share is below the median value. In the supplemental analyses below, I also use the 75th percentile and 90th percentile of da Vinci share

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[41] These are recorded with a value of "USE" in the "Unit" field. *See* Intuitive Surgical, Inc. Responses to Rebotix Repair, LLC's Data Questions, July 10, 2021, questions 6 and 7 at pp. 3-4.

[42] Training instruments can be identified based on their "Material Num" field suffix. *See* Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 2.

as a delineation for assigning customers to low- and high-share groups. This categorization assigns customers into one of the groups for all years from 2012-2021 based on the customer's share in 2021.

17. I calculate two price metrics: instrument price per procedure and instrument price per use. I calculate the price per procedure for each customer as the sum of its "Net Sales" over the sum of its da Vinci procedures in a given year based on the Intuitive Procedures data. I then keep observations with positive prices, remove the 1st and 99th percentiles of prices across 2012-2021 and calculate the median price in each year.[43]

18. To calculate the instrument price per use, I first determine the number of uses for each instrument using the field called "Number Of Uses (if Each) or Qty per Box (if Box)." When the number of uses is not available for a given product, I use the median number of uses calculated for each base material and unit type. I then multiply the number of uses for each instrument by the "Sales Qty" field. Second, I omit transactions with zero dollars in gross sales as well as instruments with less than 100 total units sold across the full period 2012-2021. Following the steps above, I aggregate "Net Sales" and product uses to the year and base material level, and keep observations with positive net sales and sales quantities. I then calculate the weighted average instrument price per use as the sum of "Net Sales" over the sum of uses in a given year.

4. Calculating Service Plan Prices

19. To calculate average service plan prices, I start with the Servicing Contracts data from 2012 through 2021. I isolate U.S. transactions by using the 'Sorg.' code = 2000.[44] I then remove the following:

- Simulator contracts based on the description of the plan;
- Service plans that are recorded in the data as being less than 1 year in duration;
- Contracts for a given system that are later updated within the same calendar year; and

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[43] The results are similar when I do not apply the filter to remove the 1st and 99th percentiles of prices per procedure.

[44] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions, at p. 10.

- Service plans with 'Material' codes associated with 'not for human use' (260023-26 and 260023-07).

20. I then merge the IDN name and system type (using "System Name" field) from the Intuitive Procedures data with the Servicing Contracts data. If a system is associated with more than one IDN (e.g. due to system transfers or hospital mergers), I keep the most recent record. This matching process captures approximately 98% of total service contract transactions.
I then use the contract description field ("Description") to categorize service plans into six categories: Premium, Complete Care, Complete Care Plus, Partnership, Essential, and Other.

21. I then take the simple average of the service contract prices within each year for a given IDN using each of the following three approaches:

- Aggregating all systems and contract types together;
- Aggregating by contract type; and
- Aggregating by system type.

22. Subsequently, I calculate the simple average of the IDN average prices within each year as well as the weighted average based on the total number of systems within each IDN in a given year.

23. In order to identify renewals in my analysis of renewal prices in Table A-6 below, I identify the chronological order of contracts and compare the first contract listed for a given system to the second contract listed for a given system. I then identify a second contract to be considered as a renewal if it meets the following conditions:

- The second contract must be of the same coverage type as the first contract (e.g., Complete Care);
- The second contract must be with the same customer as the first contract;
- The second contract must start after the first transaction ends; and

- The first contract must be 4 years in length.[45]

24. Subsequently, I count the number of systems with first contracts that start in each year from 2012-2021 with an observed renewal during 2012-2021. For each initial year during the first contract, I calculate the following:

- The average price of the first contract.
- The average price of the first renewal.
- The percent of systems with first contract and first renewal having the same price.
- The percent of systems with first renewal price higher than the initial contract.
- The percent of systems with first renewal price lower than the initial contract.

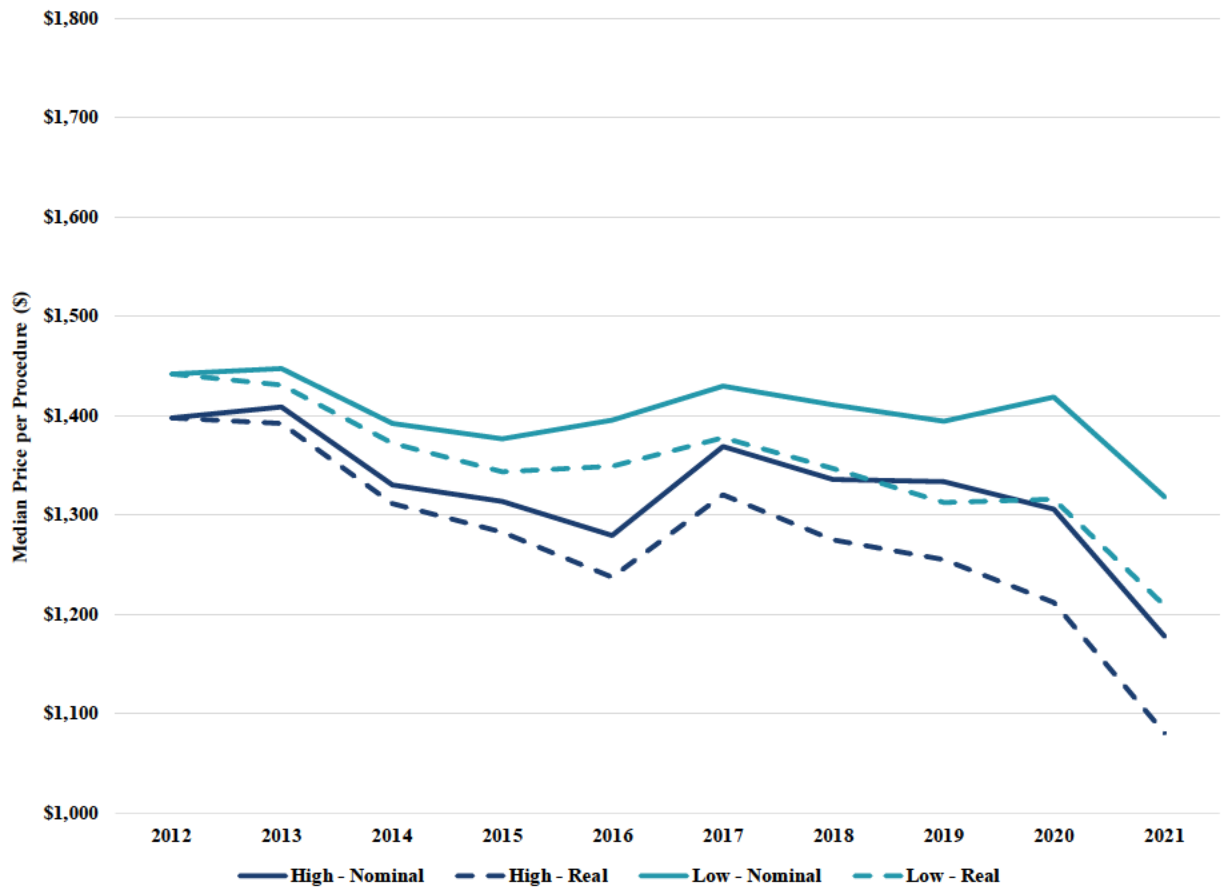
25. I then calculate the average over the entire timespan of each of the three percentages above, weighted by the number of systems in each year.

C. SUPPLEMENTAL INSTRUMENT PRICING ANALYSES

26. The figures below present the pricing trends for low- and high-share groups of customers defined when using the 75th and 90th percentiles of da Vinci procedure share (da Vinci share) instead of the median.

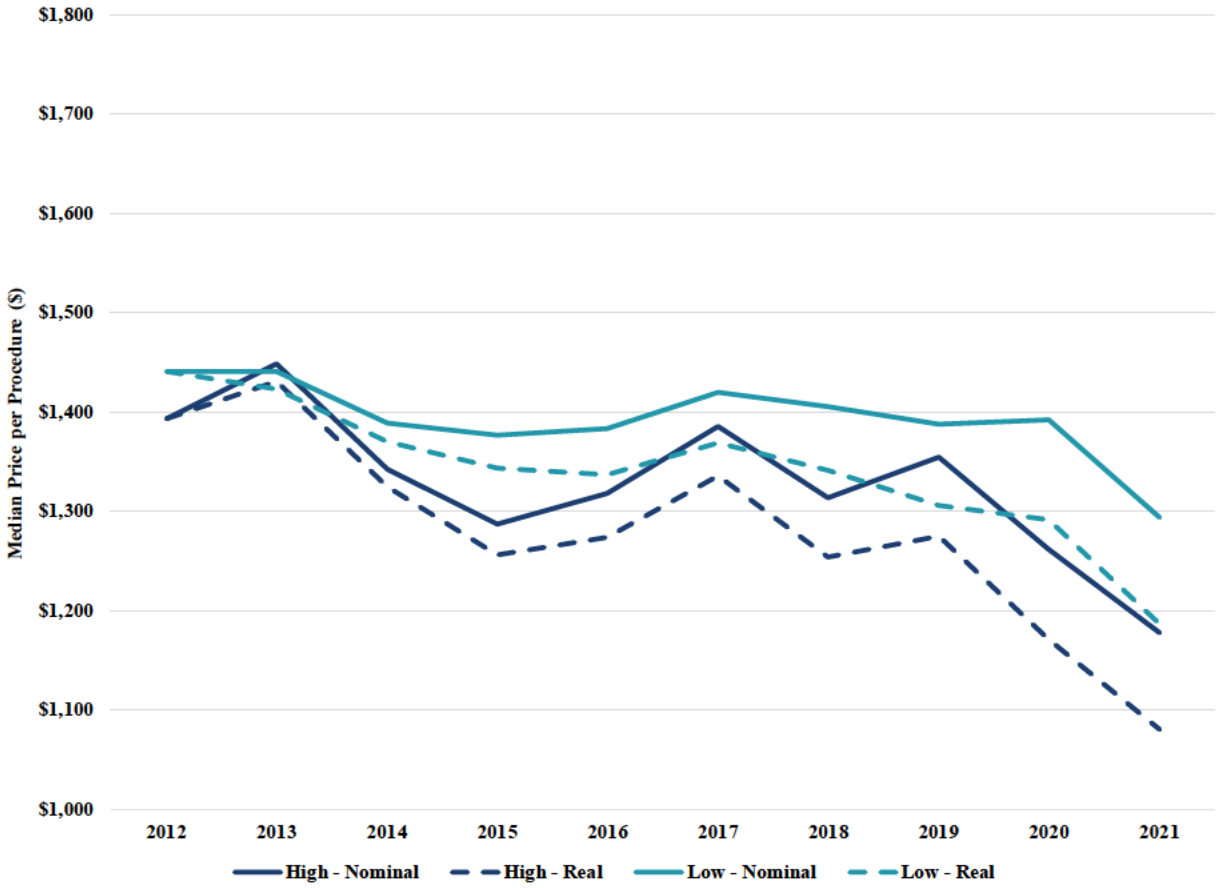
[45] A contract having pricing for 4 years reflects an overall term of 5 years. The sales, licensing, and servicing agreement ("SLSA") states that the "first year of initial term" is "included in system price" and it provides pricing for "subsequent years (2-5) of the initial term." *See* Intuitive-00005135 at 145. I include in my workpapers a version of this table which considers all contracts regardless of initial term length.

FIGURE A-1 – MEDIAN PRICE PER PROCEDURE – HIGH DA VINCI SHARE ABOVE 75TH PERCENTILE



Sources and Notes: Prices per procedure relate net sales amounts calculated from Intuitive's I&A sales data to Intuitive's procedures data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the 75th percentile of da Vinci share of total procedures (55 percent).

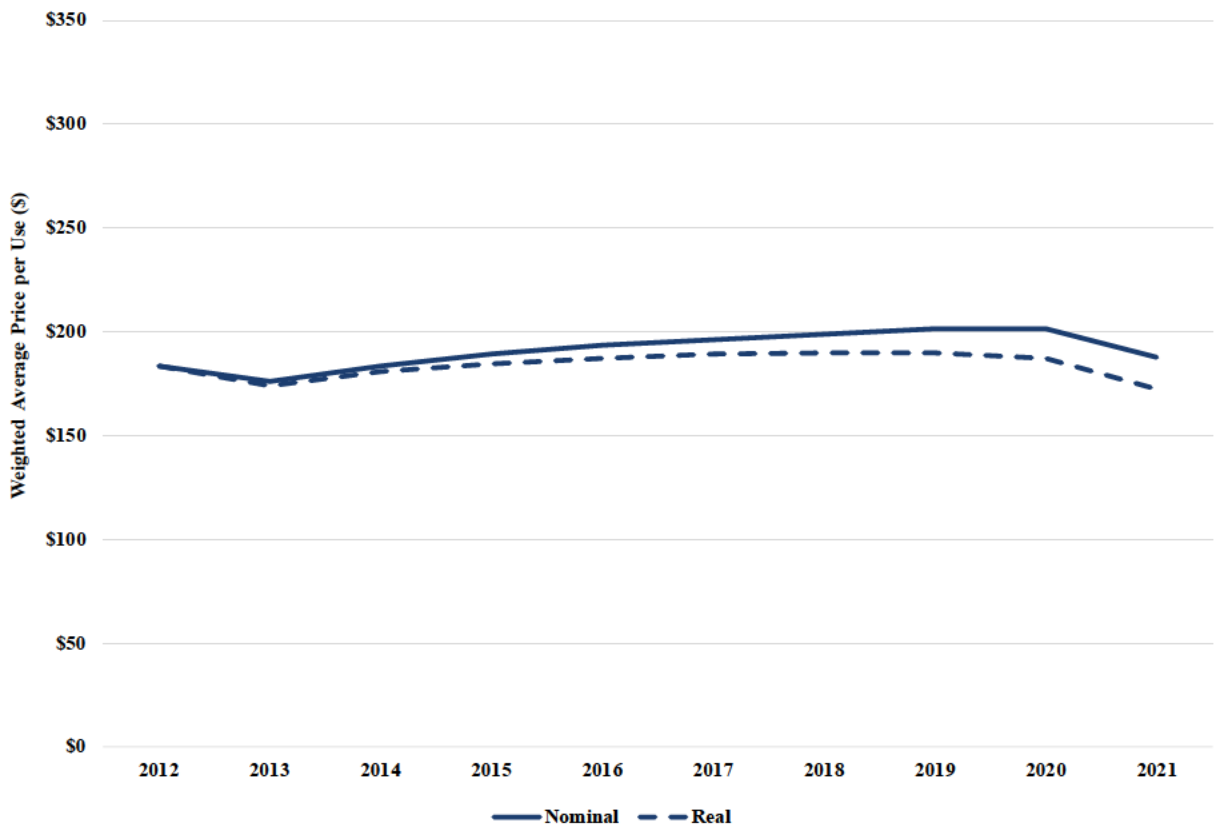
FIGURE A-2 – MEDIAN PRICE PER PROCEDURE – HIGH DA VINCI SHARE ABOVE 90TH PERCENTILE



Sources and Notes: Prices per procedure relate net sales amounts calculated from Intuitive's I&A sales data to Intuitive's procedures data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the 90th percentile of da Vinci share of total procedures (69 percent).

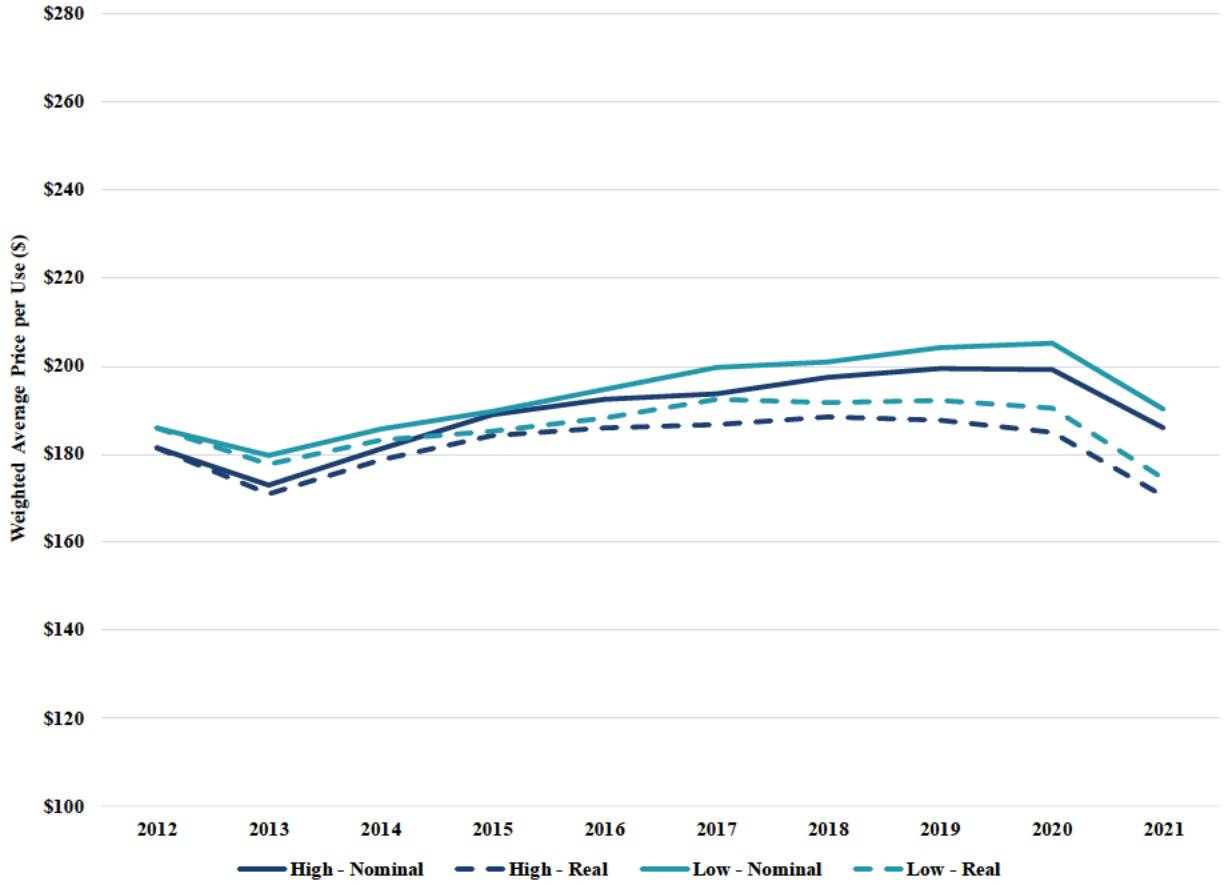
27. The figures below present the instrument pricing trends calculated on the per use basis.

FIGURE A-3 – WEIGHTED AVERAGE PRICE PER USE



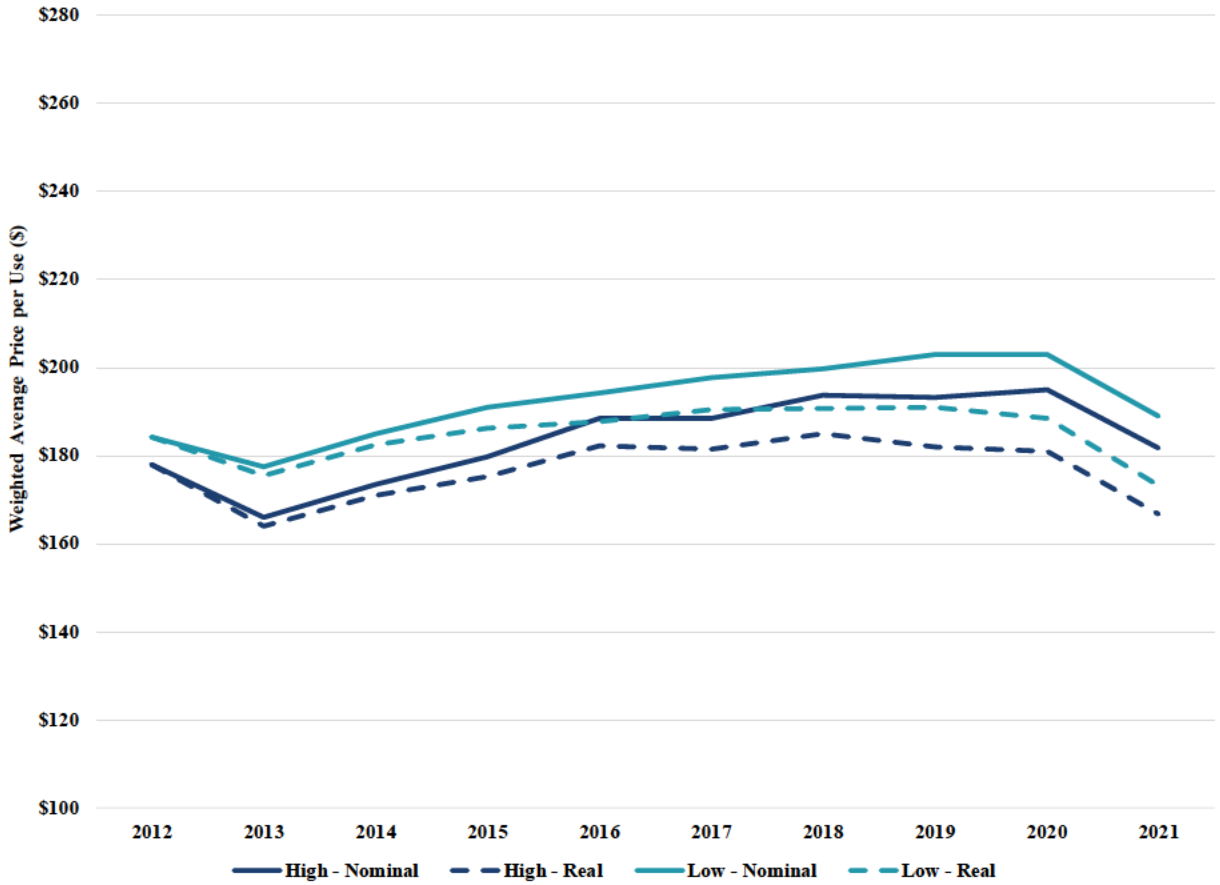
Sources and Notes: Prices per use relate net sales amounts to the number of uses for sold instruments as calculated from Intuitive's I&A sales data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391).

FIGURE A-4 – WEIGHTED AVERAGE PRICE PER USE – HIGH DA VINCI SHARE ABOVE 50TH PERCENTILE



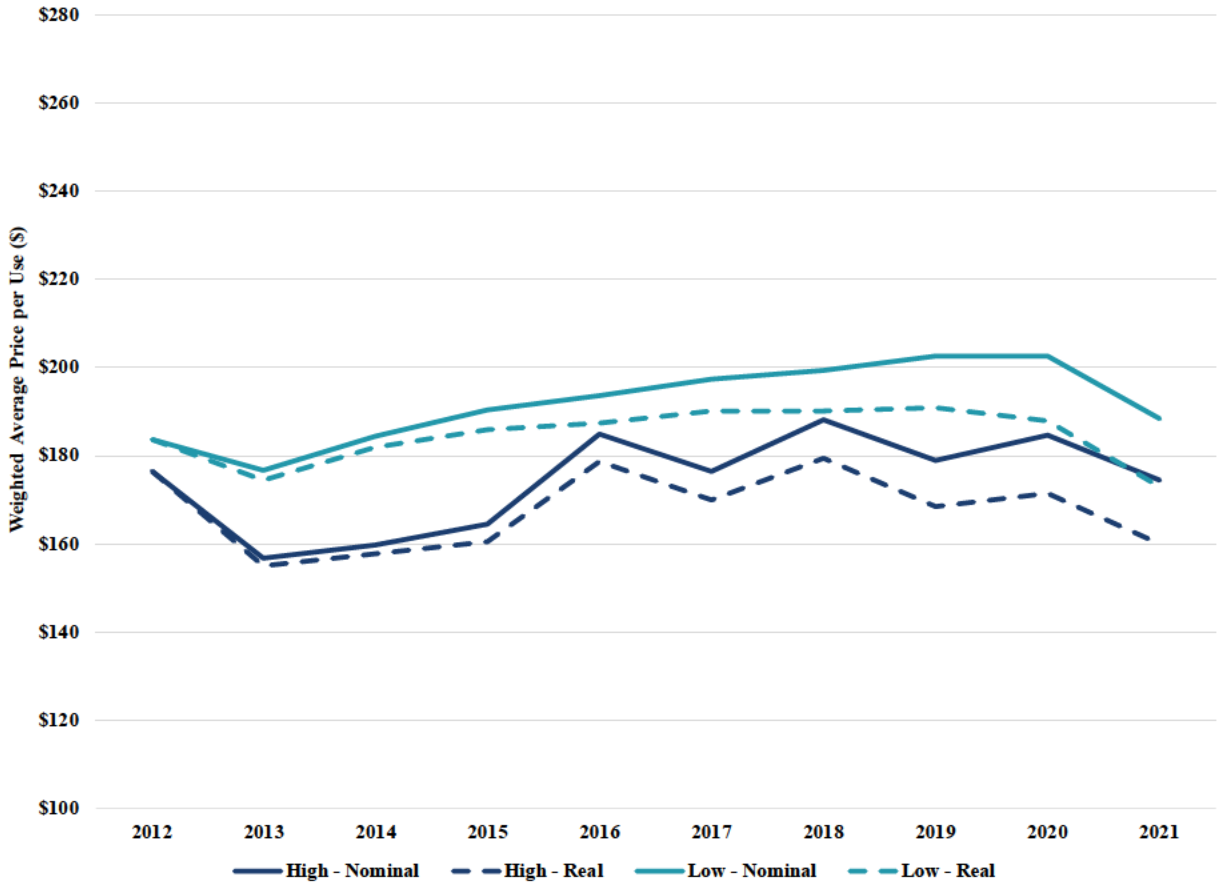
Sources and Notes: Prices per use relate net sales amounts to the number of uses for sold instruments as calculated from Intuitive's I&A sales data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the 50th percentile of da Vinci share of total procedures (40 percent).

FIGURE A-5 – WEIGHTED AVERAGE PRICE PER USE – HIGH DA VINCI SHARE ABOVE 75TH PERCENTILE



Sources and Notes: Prices per use relate net sales amounts to the number of uses for sold instruments as calculated from Intuitive's I&A sales data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the 75th percentile of da Vinci share of total procedures (55 percent).

FIGURE A-6 – WEIGHTED AVERAGE PRICE PER USE – HIGH DA VINCI SHARE ABOVE 90TH PERCENTILE



Sources and Notes: Prices per use relate net sales amounts to the number of uses for sold instruments as calculated from Intuitive's I&A sales data. Current dollars are converted to constant 2012 dollars using the producer price index for medical equipment and supplies manufacturing PPI (PCU33913391). Customers are divided into low and high groups based on the 90th percentile of da Vinci share of total procedures (69 percent).

28. I also use a regression model to analyze the price trends while controlling for changes in instrument mix over time. More specifically, I estimate the following regression model:

$$p_{it} = \alpha + \beta_t \lambda_t + \gamma_i D_i + \varepsilon_{it}$$

where p_{it} is the price per use for base material i and year t following the calculations detailed in Section B.3 above, λ_t is an indicator variable for year t, D_i is an indicator variable for base material i which allows me to control for changes in instrument mix over time, and ε_{it} is the error term. The price per use regressions are weighted by the total number of uses for each base material-year.

29. I present my regression results estimated using all instruments in Table A-1. Consistent with the price trends shown in Figure A-3, I find that the net price per use has not increased over the period and has in fact slightly decreased in the last two years. This confirms that my assessment of Intuitive's instrument pricing does not change, after controlling for instrument mix changes over time.

TABLE A-1 - REGRESSION ANALYSIS OF INSTRUMENT PRICE TRENDS OVER TIME

	Net Price Per Use [A]
Year = 2013	-1.067
	(1.125)
Year = 2014	-1.345
	(1.129)
Year = 2015	-1.162
	(1.117)
Year = 2016	-0.981
	(1.100)
Year = 2017	-1.051
	(1.091)
Year = 2018	-1.111
	(1.092)
Year = 2019	-1.006
	(1.101)
Year = 2020	-2.095*
	(1.138)
Year = 2021	-4.799***
	(1.200)
Constant	194.4***
	(0.895)
# of Unique Base Materials	160
Observations	1047
R2	0.998

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: Prices per use relate net sales amounts to instrument uses as calculated from Intuitive's I&A sales data. Observations are weighted by the total number of uses for each base material-year.

30. In Table A-2, I report the regression results estimated using S/Si instruments only. Similar to the price trend for all instruments, I find that the net price per use remains statistically flat. This

confirms that, controlling for instrument mix changes, Intuitive has not been increasing S/Si instrument prices over time.

TABLE A-2 - REGRESSION ANALYSIS OF S/SI INSTRUMENT PRICE TRENDS OVER TIME

	Net Price Per Use [A]
Year = 2013	-1.080
	(1.024)
Year = 2014	-1.387
	(1.040)
Year = 2015	-1.304
	(1.069)
Year = 2016	-1.127
	(1.089)
Year = 2017	-1.222
	(1.121)
Year = 2018	-1.367
	(1.187)
Year = 2019	-1.214
	(1.320)
Year = 2020	-1.199
	(1.737)
Year = 2021	1.466
	(2.725)
Constant	197.1***
	(0.758)
# of Unique Base Materials	77
Observations	620
R2	0.997

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Notes: Prices per use relate net sales amounts to instrument uses as calculated from Intuitive's I&A sales data. Observations are weighted by the total number of uses for each base material-year.

D. SUPPLEMENTAL SUBSTITUTION ANALYSES

31. Table A-3 depicts the changes in relative shares among three surgical modalities over the period between 2012 and 2021 for hospitals that used the da Vinci Surgical System as of 2021. In column [A], I perform this analysis at the individual hospital level. In column [B], I aggregate

procedures to the IDN level for hospitals that belong to the same hospital network and have greater than zero da Vinci procedures.

TABLE A-3 – COMPOSITION OF MODALITY CHANGES FOR DA VINCI CUSTOMERS IN 2021

		Hospital Level [A]	IDN Level [B]
All Customers			
Number of Customers	[1]	2,027	649
Avg. %-Point Change in da Vinci Share	[2]	0.35	0.32
Avg. %-Point Change in Laparoscopic Share	[3]	-0.18	-0.17
Avg. %-Point Change in Open Share	[4]	-0.18	-0.15
Customers Without Change in da Vinci Share			
Number of Customers	[5]	9	1
% of All Customers	[6]	0.44%	0.15%
Customers With da Vinci Share Increase			
Number of Customers	[7]	1,936	626
% of All Customers	[8]	95.51%	96.46%
Avg. %-Point Change in da Vinci Share	[9]	0.37	0.33
Avg. %-Point Change in Laparoscopic Share	[10]	-0.19	-0.18
Avg. %-Point Change in Open Share	[11]	-0.18	-0.15
Customers With da Vinci Share Decrease			
Number of Customers	[12]	82	22
% of All Customers	[13]	4.05%	3.39%
Avg. %-Point Change in da Vinci Share	[14]	-0.12	-0.05
Avg. %-Point Change in Laparoscopic Share	[15]	0.12	0.09
Avg. %-Point Change in Open Share	[16]	-0.01	-0.04

Sources and Notes:
Intuitive-00706098.xlsx, "IQVIA" sheet.
This table depicts changes in relative shares among three surgical modalities over the period between 2012 and 2021 for hospitals that used the da Vinci system as of 2021.
[B]: For hospitals without IDNs, figures reflect hospital-level information.
[6]: [5]/[1].
[8]: [7]/[1].
[13]: [12]/[1].

32. In both analyses, I identify the number of customers that had no change, an increase, or a decrease in its da Vinci share. I then compute the average percentage point change in shares for

da Vinci, open surgery, and laparoscopic modalities among customers within each group. The analysis presented in the table below is based on procedure categories that are tracked by the IQVIA data.

33. In Tables A-4 and A-5, I use the IQVIA data for 2021 to summarize the relative proportions of procedure volumes by comparing the extent of procedures performed with the da Vinci system versus those performed through laparoscopic and open surgery. As a sensitivity to the tables presented in my report, these examine the shares on a weighted-average basis, instead of using unweighted average. In Table A-4, I look at all hospitals that performed at least one surgery of the procedure type during 2021, regardless of modality. In Table A-5, I focus only on hospitals that utilized the da Vinci system during 2021. The shares presented in both tables are weighted by the hospital's procedure volumes.

TABLE A-4 – WEIGHTED AVERAGE MODALITY SHARE OF PROCEDURE CATEGORY AT HOSPITALS PERFORMING ANY SURGERIES IN THESE CATEGORIES DURING 2021

Category & Procedure Type	# of Hospitals Performing Procedure	% of These Hospitals Using da Vinci	da Vinci Share	Laparoscopic Share	Open Share
	[A]	[B]	[C]	[D]	[E]
Colorectal					
Colon	3,603	49%	33%	11%	56%
Rectal	1,733	59%	42%	11%	47%
General Surgery					
Bariatric	2,701	33%	29%	55%	16%
Cholecystectomy	4,209	42%	17%	76%	7%
Hernia	4,262	47%	34%	16%	50%
HPB	1,119	37%	26%	8%	66%
Foregut	2,784	53%	25%	71%	3%
Gynecology					
Hysterectomy	3,622	50%	51%	33%	17%
Thoracic	2,074	36%	37%	37%	26%
Urology					
Nephrectomy	2,215	62%	51%	25%	23%
Prostatectomy	2,055	70%	84%	13%	3%

Sources and Notes:
Based on IQVIA data for 2021. "Cardiac" and "Head and Neck" categories are omitted because they are not tracked in the IQVIA data and account for less than 1 percent of all da Vinci procedures in 2021 based on Intuitive-00706097. "HPB" stands for Hepato-Pancreato-Biliary surgery, which involves surgery of the liver, pancreas and biliary system.
[A]: 4,452 total hospitals in the IQVIA dataset performed at least one surgery in 2021.

TABLE A-5 – WEIGHTED AVERAGE MODALITY SHARE OF PROCEDURE CATEGORY AT HOSPITALS PERFORMING DA VINCI SURGERIES DURING 2021

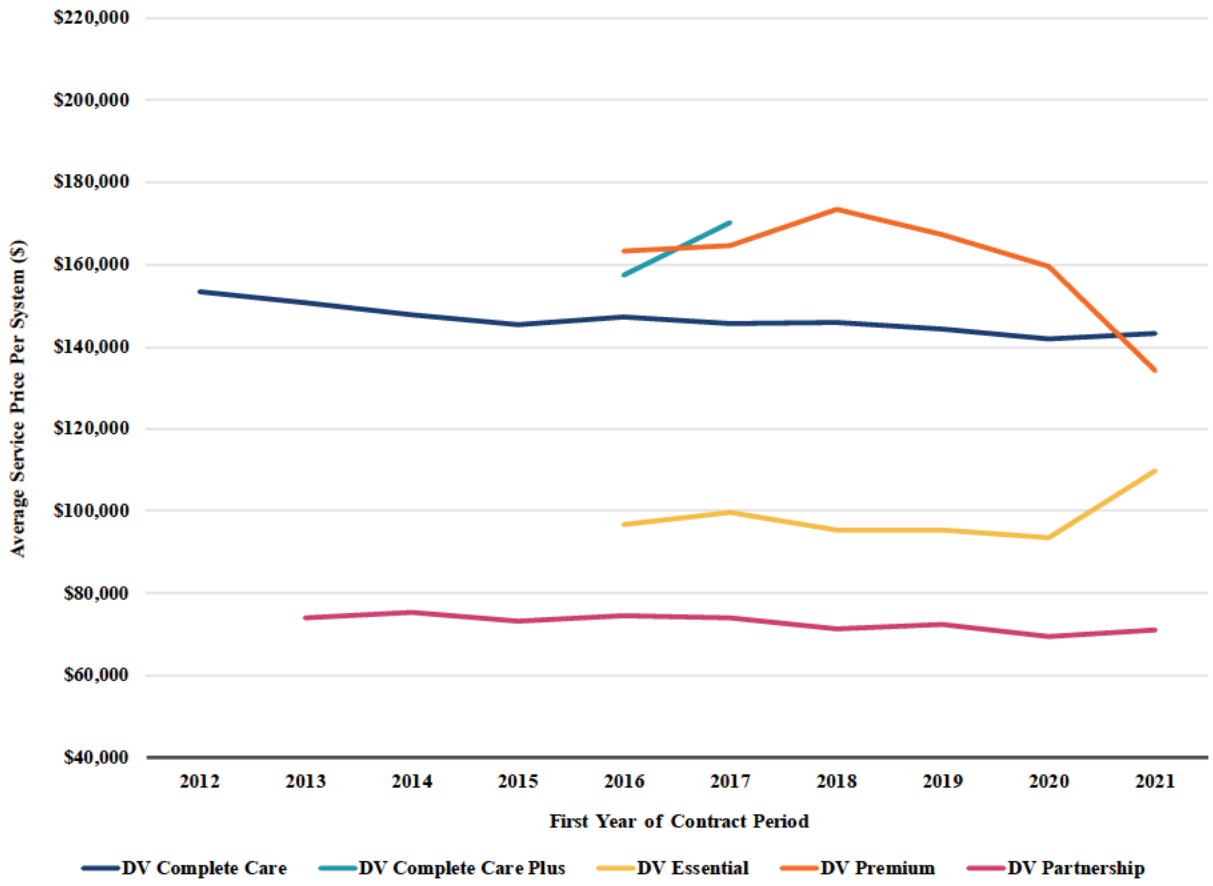
Category & Procedure Type	# of Hospitals Performing Procedure	da Vinci Share	Laparoscopic Share	Open Share
	[A]	[B]	[C]	[D]
Colorectal				
Colon	2,015	39%	8%	53%
Rectal	1,380	45%	9%	45%
General Surgery				
Bariatric	1,813	33%	51%	16%
Cholecystectomy	2,054	22%	71%	7%
Hernia	2,066	42%	13%	45%
HPB	937	27%	7%	66%
Foregut	1,859	29%	68%	4%
Gynecology				
Hysterectomy	2,000	56%	28%	15%
Thoracic	1,566	40%	36%	24%
Urology				
Nephrectomy	1,698	55%	23%	22%
Prostatectomy	1,640	87%	10%	2%

Sources and Notes:
Based on IQVIA data for 2021. "Cardiac" and "Head and Neck" categories are omitted because they are not tracked in the IQVIA data and account for less than 1 percent of all da Vinci procedures in 2021 based on Intuitive-00706097. "HPB" stands for Hepato-Pancreato-Biliary surgery, which involves surgery of the liver, pancreas and biliary system.
[A]: 2,076 total hospitals in the IQVIA dataset performed at least one da Vinci surgery in 2021.

E. SUPPLEMENTAL SERVICE PRICING ANALYSES

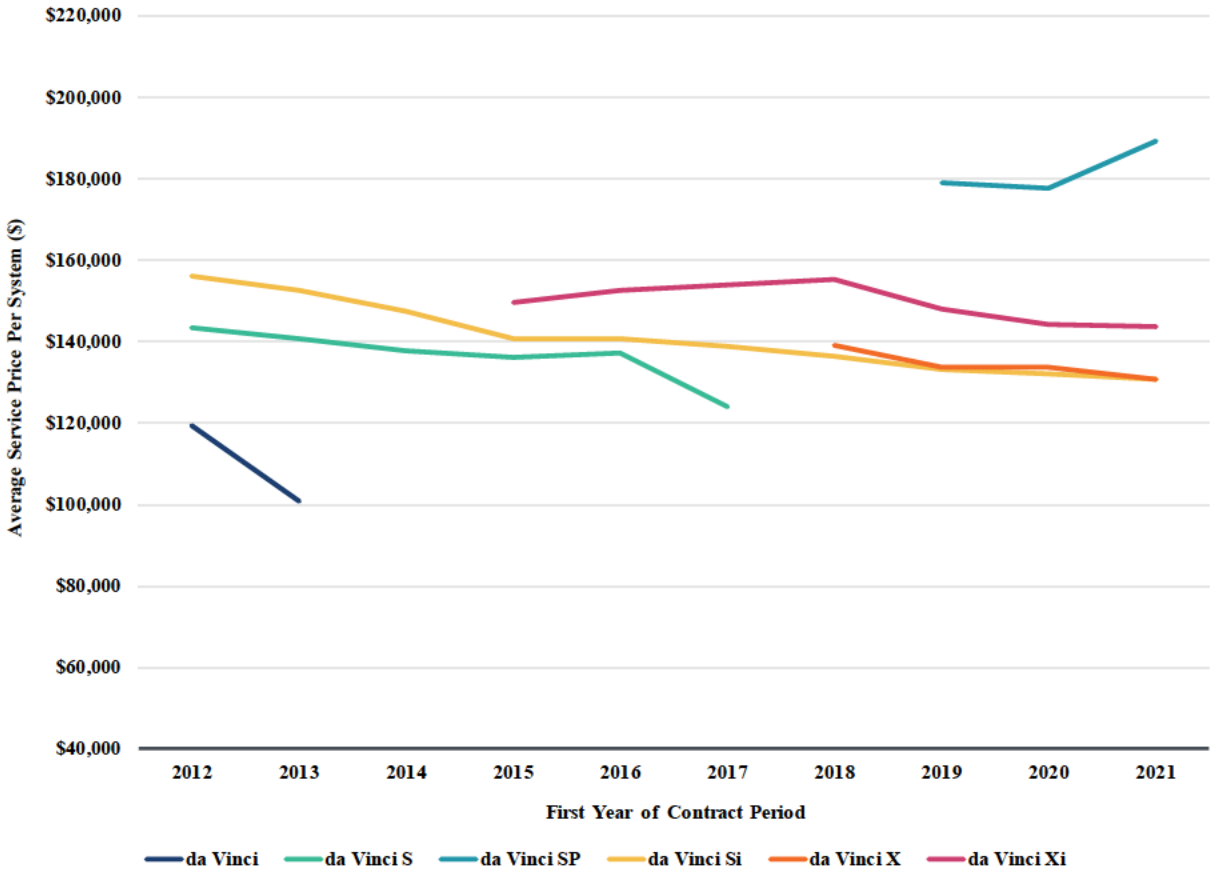
34. The figures below present average service plan prices adjusted for inflation using the medical equipment and supplies manufacturing PPI.

FIGURE A-7 – AVERAGE ANNUAL SERVICE PLAN PRICES, BY SERVICE PLAN TYPE (INFLATION ADJUSTED)



Sources and Notes: Based on Intuitive's Servicing Contracts data.

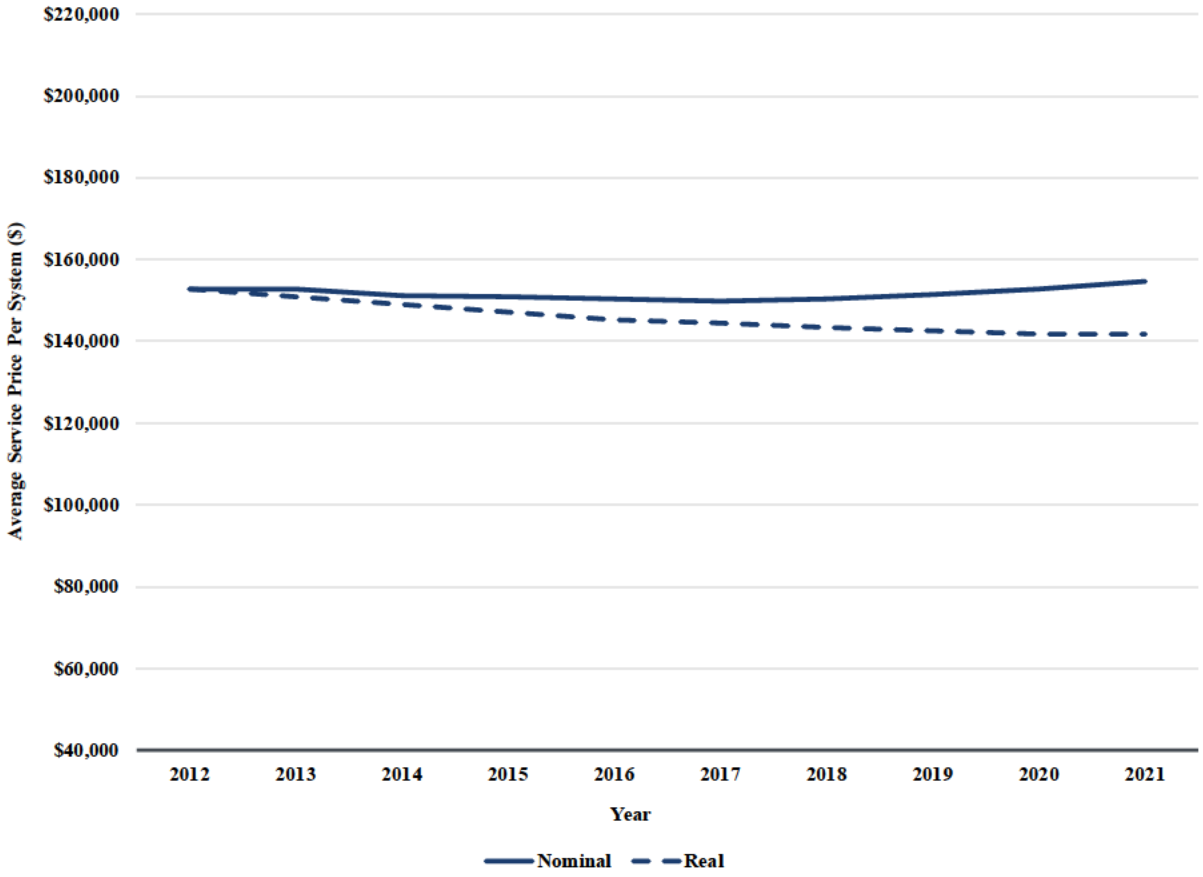
FIGURE A-8 – AVERAGE ANNUAL SERVICE PLAN PRICES, BY SYSTEM MODEL (INFLATION ADJUSTED)



Sources and Notes: Based on Intuitive's Servicing Contracts data.

35. In the figure below, I consider an alternative methodology to calculate average service prices during a period. Specifically, I assign the annual value of a contract to each year during its contract period. Average prices using this methodology are displayed in real and nominal terms below:

FIGURE A-9 – AVERAGE ANNUAL SERVICE PLAN PRICES (ANNUAL VALUE ASSIGNED TO EACH YEAR OF CONTRACT PERIOD)



Sources and Notes: Based on Intuitive's Servicing Contracts data. For purposes of the graph, the annual amount of each contract is recorded under each individual year of the contract's duration.

36. The following table compares the prices of initial service contracts with those of the first renewal contracts:

TABLE A-6 – COMPARISON OF RENEWING SERVICE PLAN PRICE TO INITIAL SERVICE PRICE, BY YEAR OF INITIAL CONTRACT

Initial Year of First Contract Period	Number of Identified Renewals	Average Price of First Contract	Average Price of First Renewal	% of Renewals Having		
				Renewal Price Higher	Renewal Price Lower	Renewal Price the Same
	[A]	[B]	[C]	[D]	[E]	[F]
2012	205	$152,491	$144,964	1.46%	29.76%	68.78%
2013	231	$152,986	$143,950	3.90%	29.00%	67.10%
2014	147	$149,687	$143,707	1.36%	30.61%	68.03%
2015	103	$148,056	$145,176	1.94%	17.48%	80.58%
2016	135	$154,336	$148,610	6.67%	23.70%	69.63%
2017	117	$158,462	$150,432	2.56%	37.61%	59.83%
		Weighted Average:	[1]	2.99%	28.46%	68.55%

Sources and Notes: Based on Intuitive's Servicing Contracts data. The table is limited to contracts having a 4-year duration during the initial contract period which begins after the initial year warranty period. Since year 2021 is the last full year of data in the servicing contracts data, year 2017 is the last year displayed on the table (i.e., 2021 is 4 years after 2017).

[A] - [F]: From "Raw Renewal Table" tab.

[1, D]: Sum([A] x [D]) / Sum([A]).

[1, E]: Sum([A] x [E]) / Sum([A]).

[1, F]: Sum([A] x [F]) / Sum([A]).

EXHIBIT A

Smith Curriculum Vitae

Loren K. Smith

Principal and Practice Co-Leader of Global Antitrust & Competition
The Brattle Group
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EDUCATION

January 2006	University of Virginia, Ph.D. in Economics
May 2001	University of Virginia, M.A. in Economics
December 1996	Mississippi State University, B.B.A. in Marketing, *Magna Cum Laude*

PROFESSIONAL EXPERIENCE

April 2020–Present	Principal, The Brattle Group, Washington, DC
April 2016–March 2020	Executive Vice President, Compass Lexecon, Washington, DC Senior Vice President, April 2014 – March 2016 Vice President, April 2013 – March 2014
September 2005–March 2013	Staff Economist, U.S. Federal Trade Commission, Washington, DC
June 2002–May 2005	Instructor, University of Virginia, Charlottesville, VA *Courses:* Intermediate Microeconomics
September 1999–May 2001	Teaching Assistant, University of Virginia, Charlottesville, VA *Courses:* Principles of Microeconomics, Principles of Macroeconomics, Graduate Math-Economics, Graduate Econometrics, Intermediate Microeconomics Research Assistant, University of Virginia, Charlottesville, VA Edgar Olsen, Charles Holt

FIELDS OF SPECIALIZATION

Antitrust and Competition Economics
Applied Microeconomics
Industrial Organization
Applied Econometrics

TESTIMONY

Testimony as Economic Expert on behalf of Intuitive Surgical, In Re: *Rebotix Repair LLC v. Intuitive Surgical, Inc.,* in the United States District Court Middle District of Florida Tampa Division, Case No. 8:20-cv-02274, Deposition: November 3, 2021.

Testimony as Economic Expert on behalf of Intuitive Surgical, In Re: *Restore Robotics LLC, and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.,* in the United States District Court Northern District of Florida Panama City Division, Case No. 5:19-cv-55, Deposition: October 21, 2021.

Testimony as Economic Expert on behalf of the Federal Trade Commission, In Re: *Federal Trade Commission and Commonwealth of Pennsylvania v. Thomas Jefferson University and Albert Einstein Healthcare Network*, In the Eastern District Court of Pennsylvania, Case No. 2:20-cv-01113-GJP, Deposition: August 26, 2020; Trial: September 15 and 16, and October 1, 2020.

REPORTS

Expert Antitrust Merits Rebuttal Report of Loren K. Smith, In Re: *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, in the United States District Court Northern District of California, Case No. 3:21-cv-03496-VC, January 18, 2023.

Expert Damages Rebuttal Report of Loren K. Smith, In Re: *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, in the United States District Court Northern District of California, Case No. 3:21-cv-03496-VC, January 18, 2023.

Expert Report of Loren K. Smith, In Re: *United States of America, ex. rel. Sarah Behnke v. CVS Caremark Corporation et al.,* in the United States District Court Eastern District of Pennsylvania, Civil Action No. 2:14-cv-00824-MSG, December 9, 2022.

Expert Report of Loren K. Smith, In Re: *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.*, in the United States District Court Northern District of California, Case No. 3:21-cv-03496-VC, December 2, 2022.

Expert Reports of Loren K. Smith, In Re: *Restore Robotics LLC, and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.,* in the United States District Court Northern District of Florida Panama City Division, Case No. 5:19-cv-55; Counterclaims Damages: August 20, 2021, Rebuttal Antitrust: September 27, 2021, Supplemental Rebuttal Report Antitrust Damages: December 23, 2022.

Expert Reports of Loren K. Smith, In Re: *Rebotix Repair LLC v. Intuitive Surgical, Inc.,* in the United States District Court Middle District of Florida Tampa Division, Case No. 8:20-cv-02274; Counterclaims Damages: July 26, 2021, Rebuttal Antitrust Merits and Rebuttal Antitrust Damages: August 30, 2021.

"Brief of Antitrust Economists as Amici Curiae in Support of Defendants-Appellants Urging Reversal," In the United States Court of Appeals for the Sixth Circuit; *St. Luke's Hospital et al., v. ProMedica Health System, Inc. et al.*; On Appeal from the United States District Court for the Northern District of Ohio; No. 3:20-cv-02533; March 1, 2021.

Expert Reports of Loren K. Smith, In Re: *Federal Trade Commission and Commonwealth of Pennsylvania v. Thomas Jefferson University and Albert Einstein Healthcare Network*, In the Eastern District Court of Pennsylvania, Case No. 2:20-cv-01113-GJP, Report: July 23, 2020, Rebuttal Report: August 20, 2020.

Expert Report of Loren K. Smith, In Re: *United States of America and the State of North Carolina v. The Charlotte-Mecklenburg Hospital Authority, d/b/a Carolinas Healthcare System*, In the District Court of North Carolina, Case No. 3:16-cv-00311-RJC-DCK, October 5, 2018.

Report to Congress Under Section 319 of the Fair and Accurate Credit Transactions Act of 2003, (with Beth Freeborn and Peter Vander Nat), December 2012.

SELECTED CONSULTING WORK RELATED TO ANTITRUST INVESTIGATIONS

Submitted a co-authored paper to the U.S. Department of Justice on the competitive implications of a vertical acquisition in the productivity software space (2022).

Submitted a co-authored paper to the U.S. Federal Trade Commission on the competitive implications of a merger in the specialty pharmacy services industry (2022).

Presented to the U.S. Department of Justice on the economic implications of a consumer products merger (2021).

Provided written and oral presentations to the U.S. Federal Trade Commission related to a proposed acquisition of a pipeline prescription pharmaceutical product (2020).

Presented and provided multiple written submissions to the U.S. Federal Trade Commission related to a proposed merger of two major hospital systems (2020).

Presented and provided multiple written submissions to the U.S. Federal Trade Commission related to a proposed merger of polyurethane foam manufacturers (2019).

Presented to the U.S. Federal Trade Commission related to a merger that, in part, proposed to combine existing and pipeline branded drugs with similar indications (2019).

Presented and provided a written submission to the U.S. Federal Trade Commission related to the proposed merger of branded pharmaceutical manufacturers (2019).

Presented to the U.S. Federal Trade Commission related to a proposed hospital merger (2018).

Submitted a white paper and gave a presentation to the U.S. Federal Trade Commission related to a proposed merger of factory-built home manufacturers (2018).

Presented to the U.S. Federal Trade Commission related to a proposed merger of food manufacturers (2017).

Presented to the U.S. Federal Trade Commission related to a proposed merger of personal and home cleaning manufacturers (2017).

Presented to the U.S. Department of Justice related to accusations of anticompetitive exclusionary conduct against a hospital system (2017).

Provided economic and econometric analysis of alleged damages, the results of which were used in a mediation that reached a favorable settlement (2016–2017).

Submitted a coauthored white paper and participated in presentations to the U.S. Federal Trade Commission related to accusations of anticompetitive exclusionary conduct against a manufacturer of medical device inputs (2015-2016).

Gave multiple presentations to the U.S. Federal Trade Commission related to a proposed merger of retail chains (2014).

Provided economic analysis related to the proposed acquisition of two community hospitals. The results were submitted to the U.S. Federal Trade Commission (2014).

Developed empirical analyses that demonstrated a lack of competitive interaction with a proposed merger partner. The results were submitted to the U.S. Federal Trade Commission (2014).

Coauthored two white papers that were submitted to the U.S. Department of Justice related to a proposed hospital acquisition (2013).

Coauthored three white papers that were submitted to the U.S. Federal Trade Commission related to a proposed acquisition in the supermarket industry (2013).

Coauthored a white paper that was submitted to the U.S. Federal Trade Commission related to a proposed acquisition in the retail auto parts industry (2013).

As economic expert for the U.S. Federal Trade Commission, evaluated the likely competitive effects of a merger of data service providers (2011).

LITIGATION SUPPORT WORK

In support of Robert Willig and Jonathan Orszag, developed economic and econometric evidence, and assisted in the preparation of expert reports and testimony on behalf of the Defendants in Re: *Sidibe, et al. v. Sutter Health*, Case No. 3:12-cv-04854.

In support of Robert Willig and with Bryan Keating, developed economic and econometric evidence, and assisted in the preparation of expert reports and testimony on behalf of the Defendants in Re: *UFCW & Employers Benefit Trust v. Sutter Health, et al.*, Case No. CSG 14-538451.

In support of Mark Israel and with Theresa Sullivan, developed economic and econometric evidence on behalf of the U.S. Federal Trade Commission in Re: *Federal Trade Commission et al. v. Draftkings, Inc. and FanDuel Limited*, Civil Action No. 17-cv-1195 (KBJ).

In support of Jonathan Orszag, developed economic theories and assisted in the preparation of an expert report and deposition testimony on behalf of Plaintiffs in Re: *Innovation Ventures, LLC v. Nutrition Science Laboratories, LLC et al.*, Case No. 2:12-cv-13850.

In support of Mark Israel and with Theresa Sullivan, developed merger simulations and assisted in preparation of expert reports and testimony on behalf of Defendants in Re: *U.S. and Plaintiff States v. Anthem and Cigna*, Civil Action No. 1:16-cv-01493.

In support of Robert Willig, developed economic and econometric evidence, and assisted in preparation of expert reports and testimony on behalf of the Defendants in Re: *Methodist Health Services Corporation v. OSF Healthcare System*, Civil Action No. 1:13-dv-01054-SLD-JEH.

In support of Robert Willig and with Bryan Keating, developed economic and econometric evidence, and assisted in preparation of expert reports and testimony on behalf of the Defendants in Re: *Federal Trade Commission and Commonwealth of Pennsylvania vs. Penn State Hershey Medical Center and PinnacleHealth System*, Civil Action No. 1:15-cv-02362.

In support of Mark Israel, developed economic and econometric evidence, and assisted in the preparation of expert reports and testimony on behalf of the U.S. Federal Trade Commission in Re: *Federal Trade Commission et al. v. Sysco Corporation and USF Holding Corp.*, Civil Action No. 15-cv-00256 (APM).

PUBLICATIONS AND OTHER PUBLICLY AVAILABLE PAPERS

"Looking Behind the Mask: Economic Analyses of Physician Group Transactions" (with Josephine Duh, Daniel Fanaras, and Bogdan Genchev), 2022, American Health Law Association, available at https://www.americanhealthlaw.org/content-library/publications/briefings/f5e6c787-59d0-4aea-92c0-946ee4de1399/Looking-Behind-the-Mask-Economic-Analyses-of-Physi

"Trends in Consumer Shopping Behavior and their Implications for Retail Grocery Merger Reviews" (with Dimitri Dimitropoulos and Renée Duplantis), 2021, *Competition Policy International*

"4 Economic Takeaways From 6th Circ. ProMedica Decision" (with Josephine Duh), 2021, *Law360*, available at https://www.law360.com/articles/1438179/4-economic-takeaways-from-6th-circ-promedica-decision

"The Other Side of the Coin: Complementarity in Mergers of Multiproduct Firms" (with Craig Minerva and Peter Herrick), 2021, American Bar Association's *Antitrust Magazine*, available at https://www.americanbar.org/groups/antitrust_law/publications/antitrust-magazine-online/2021/october/the-other-side-of-the-coin/

"The Competitive Implications of Private Label Mergers," (with Matt Schmitt), 2021, American Bar Association's *Antitrust Law Journal*, available at https://www.americanbar.org/digital-asset-abstract.html/content/dam/aba/publishing/antitrust_law_journal/alj-833/schmitt-smith.pdf

"Understanding the Econometric Tools of Antitrust – With No Math!" (with Michael Cragg and Charles Gibbons), 2021, American Bar Association's *Antitrust*, available at https://www.americanbar.org/groups/antitrust_law/publications/antitrust_magazine/2021/atmag-spring2021-vol35-no2/
(*Concurrences* and the George Washington University Law School's Competition Law Center 2021 Antitrust Writing Awards Winner – Best Business Articles: Economics)

"Clarifying Bundle Markets and Distinguishing Them from Cluster Markets" (with Kevin Hahm), 2021, American Bar Association's *The Antitrust Source,* available at https://www.americanbar.org/content/dam/aba/publishing/antitrust_source/2021/feb-2021/atsource-feb2021-full.pdf

"The Use of Econometrics in Merger Reviews" (with Christopher R. Rybak), 2020, American Bar Association's *Economics Committee Spring Newsletter*, available at https://www.americanbar.org/digital-asset-abstract.html/content/dam/aba/administrative/antitrust_law/aba-economics-committee-newsletter-spring2020.pdf

"Platforms, Entry, and Innovation,"(with Bryan Keating), 2019, Comment to Federal Trade Commission Hearings Announcement (Docket ID FTC-2019-0032), available at https://www.regulations.gov/document?D=FTC-2019-0032-0016

"Unilateral Effect Analysis of Health Care Markets," *Economics of Health Care Mergers & the Pharmaceutical Industry* (an ALHA Antitrust Practice Group Toolkit), 2019, available at https://www.healthlawyers.org/Members/PracticeGroups/Antitrust/Pages/default.aspx

"Do Retail Mergers Affect Competition? Evidence from Grocery Retailing," (with Dan Hosken and Luke M. Olsen), *Journal of Economics and Management Strategy*, Vol. 27, Iss. 1, pp. 3-22, Spring 2018.

"Toward a More Complete Treatment of Efficiencies in Merger Analysis: Lessons from Recent Challenges," (with Jonathan M. Orszag), *The Antitrust Source*, Vol. 16, No. 1, October 2016.

"The Prominence of Market Definition in Antitrust Evaluation and Litigation," (with Maria Stoyadinova), *Global Antitrust Economics: Current Issues in Antitrust Law and Economics*, Eds. Douglas H. Ginsburg and Joshua D. Wright, New York: Institute of Competition Law, 2016, pp. 103-116.

"Can Entry or Exit Event Studies Inform Horizontal Merger Analysis? Evidence from Grocery Retailing," (with Dan Hosken and Luke M. Olsen), *Economic Inquiry*, Vol. 54, Iss. 1, pp. 342-360, January 2016.

"Dynamics in a Mature Industry: Entry, Exit, and Growth of Big-Box Grocery Retailers," (with Dan Hanner, Dan Hosken, and Luke M. Olsen), *Journal of Economics and Management Strategy,* Vol. 24, Iss. 1, pp. 22-46, Spring 2015.

"Dynamics and Equilibrium in the Market for Commercial Aircraft," *Journal of Applied Econometrics*, Vol. 27, Iss. 1, pp. 1-33, February 2012.

"New Market Policy Effects on Used Markets: Theory and Evidence," *The B.E. Journal of Economic Analysis & Policy*, Vol. 9, Iss. 1 (Topics), Article 32, July 2009.

AWARDS AND HONORS

Who's Who Legal Thought Leaders – Competition Economists, 2023

Lexology Client Choice Award – Competition Economists, 2022

Who's Who Legal Competition – Competition Economists, 2019 - 2022

Who's Who Legal Competition: Future Leaders – Economists, 2017, 2018 (named one of the four "Most Highly Regarded" competition economists in North America in 2018)

Award for Outstanding Scholarship: for outstanding contributions to the economics literature and to the pursuit of scholarship at the Federal Trade Commission, 2012

Janet D. Steiger Award: for outstanding contributions to the Pay-for-Delay Team, Federal Trade Commission, 2012

Predoctoral Fellowship, Bankard Fund for Political Economy, University of Virginia, 2003-2004

Research Grant, Darden Business School, University of Virginia, 2002

Graduate Fellowship, University of Virginia, 1999–2002

MISCELLANEOUS

REFEREE

International Journal of Game Theory

International Journal of Industrial Organization

Economic Theory

Journal of Policy Analysis and Management

TEACHING

Full Courses:

Econonometrics – Johns Hopkins University, 2008

Intermediate Microeconomics – University of Virginia, 2002–2005

Mini Courses:

"Mergers" with Miguel de la Mano, Sean Ennis, and Nicolas Hill – Fordham Law School, 2012

"The Economics of Vertical Restraints" – GHV, Budapest, HU, 2010

"Quantitative Methods for Merger Investigation" with Keith Brand – CADE, Brasilia, BR, 2009

"Quantitative Methods for Antitrust Economists" – Competition Commission, Pretoria, ZA, 2007

"Introduction to Quantitative Methods for Antitrust Lawyers" – FTC, 2006, 2007, and 2008

PRESENTATIONS AND SEMINARS

Fordham Competition Law Institute – 49th Annual Conference on International Antitrust Law and Policy and Antitrust Economics Workshops, New York, NY

American Bar Association Antitrust Law Section and Health Law Section 2022 Antitrust in Healthcare Conference – Pharma Conduct Trends: Biosimilars, Generics, Pay-for-Delay, Arlington, VA

Concurrences 6th Global Antitrust Economics Conference – Acquisitions in High-Tech Space: Market Power and Innovation Issues, Webinar

Fordham Competition Law Institute – 48th Annual Conference on International Antitrust Law and Policy and Antitrust Economics Workshops, New York, NY

American Bar Association Antitrust Enforcement Priorities for the Healthcare Industry in 2021 Roundtable

Troutman Pepper – Antitrust Economics – The Building Blocks, Webinar

American Health Law Association Education Center – Antitrust Enforcement Update on Hospital and Health System Mergers, Webinar

Fordham Competition Law Institute – 47th Annual Conference on International Antitrust Law and Policy and Antitrust Economics Workshops, Webinar

Concurrences and Fordham University School of Law – Antitrust in Life Sciences Conference, Webinar

American Bar Association Economics Fundamentals, Webinar

15th Annual Kirkland Antitrust & Competition Institute – Intersection of Antitrust and Everything Else, Washington, DC

Pepper Hamilton's Annual Antitrust CLE Event, Philadelphia, PA

Fordham Competition Law Institute – 44th Annual Conference on International Antitrust Law & Policy, New York, NY

International Industrial Organization Conference, Boston, MA

GCR Live 2nd Annual Antitrust Litigation USA, New York, NY

The Global Antitrust Economics Conference – George Mason School of Law, Arlington, VA

Compass Lexecon – Economics Seminar, Washington, DC

Southern Economic Association – Annual Meeting, New Orleans, LA

University of Maryland – Econometrics Seminar, College Park, MD

Bureau of Labor Statistics – Empirical IO Seminar, Washington, DC

Drexel University – Industrial Organization Seminar, Philadelphia, PA

American Social Sciences Association – Annual Meeting, Philadelphia, PA

Southern Economic Association – Annual Meeting, New Orleans, LA

University of Virginia – Microeconomics Seminar, Charlottesville, VA

International Industrial Organization Conference, Chicago, IL

COMMUNITY ACTIVITIES

Tutor, Community Club, Washington, DC, 2007–2011

CITIZENSHIP

United States

Exhibit B
Materials Considered

Bates-Stamped Documents
[1] AHP004630
[2] AHS_MGMT000025
[3] BB001260
[4] BSWH-0000221
[5] BSWH-0000255
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[197] SIS091199
[198] SIS095124
[199] SIS119299
[200] SIS119300
[201] VMC-00014375
[202] VMC-00020652

Case Documents

[203] Consolidated Amended Class Action Complaint, In Re: da Vinci Surgical Robot Antitrust Litigation, Lead Case No. 3:21-cv-03825-VC, September 10, 2021.
[204] Plaintiff Franciscan Alliance, Inc.'s Amended Objections and Responses to Defendant's Second Set of Interrogatories to Plaintiffs, September 30, 2022.
[205] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Data Questions.
[206] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Follow-Up Data Questions.
[207] Intuitive Surgical, Inc. Responses to Class Plaintiffs' Second Follow-Up Data Questions.
[208] Intuitive Surgical, Inc. Responses to Rebotix Repair, LLC's Data Questions, July 10, 2021.
[209] Intuitive Surgical, Inc. Responses to Restore's Data Questions, July 10, 2021.

Expert Reports

[210] Expert Antitrust Merits Rebuttal Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.* , Case No. 3:21-cv-03496, January 18, 2023 and materials cited therein.
[211] Expert Antitrust Merits Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc.* , Case No. 8:20-cv-02274, August 30, 2021 and materials cited therein.
[212] Expert Damages Rebuttal Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc* ., Case No. 8:20-cv-02274, August 30, 2021 and materials cited therein.
[213] Expert Damages Rebuttal Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc.* , Case No. 3:21-cv-03496, January 18, 2023 and materials cited therein.
[214] Expert Rebuttal Report of Loren K. Smith, Ph.D., *Restore Robotics LLC, Restore Robotics Repair LLC, and Clif Parker Robotics LLC v. Intuitive Surgical, Inc* ., Case No. 5:19-cv-55, September 27, 2021 and materials cited therein.

[215] Expert Report of Christy Foreman, MBE, In Re: da Vinci Surgical Robot Antitrust Litigation, Case No. 3:21-cv-03825-VC, January 18, 2023.
[216] Expert Report of Dr. Robert D. Howe, In Re: da Vinci Surgical Robot Antitrust Litigation, Case No. 3:21-cv-03825-VC, January 18, 2023.
[217] Expert Report of Loren K. Smith, Ph.D., *Rebotix Repair LLC v. Intuitive Surgical, Inc* ., Case No. 8:20-cv-02274, July 26, 2021 and materials cited therein.
[218] Expert Report of Loren K. Smith, Ph.D., *Restore Robotics LLC and Restore Robotics Repair LLC v. Intuitive Surgical, Inc.* , Case No. 5:19-cv-55, August 20, 2021 and materials cited therein.
[219] Expert Report of Loren K. Smith, Ph.D., *Surgical Instrument Service Company, Inc. v. Intuitive Surgical, Inc* ., Case No. 3:21-cv-03496-VC, December 2, 2022 and materials cited therein.
[220] Expert Report of Professor Einer Elhauge, In Re: da Vinci Surgical Robot Antitrust Litigation, Lead Case No. 3:21-cv-03825-VC, December 1, 2022 and backup materials.
[221] Expert Report of Robert Mills, *Rebotix Repair LLC v. Intuitive Surgical, Inc.* , Case No. 8:20-cv-02274, July 26, 2021 and backup materials.

Depositions

[222] Anthony McGrogan (in *Rebotix*) Deposition Transcript and Exhibits, June 7, 2021.
[223] Bob DeSantis (in *Rebotix*) Deposition Transcript and Exhibits, May 27, 2021.
[224] Bob DeSantis (in *Restore*) Deposition Transcript and Exhibits, May 20, 2021.
[225] Chris Gamiddo (*in Restore*) Deposition Transcript and Exhibits, June 8, 2021.
[226] Chris Gibson (in *Rebotix*) Deposition Transcript and Exhibits, June 22, 2021.
[227] Clif Parker (*in Restore*) Deposition Transcript and Exhibits, May 4, 2021.
[228] Clif Parker Deposition Transcript and Exhibits, October 25, 2022.
[229] Colin Morales 30(b)(1) Deposition Transcript and Exhibits, November 9, 2022.
[230] David Mixner (*in Rebotix*) Deposition Transcript and Exhibits, June 10, 2021.
[231] David Rosa (in *Restore*) Deposition Transcript and Exhibits, May 19, 2021.
[232] Dipen Maun Deposition Transcript and Exhibits, November 8, 2022.
[233] Ed Harrich (in *Rebotix*) Deposition Transcript and Exhibits, May 24, 2021.
[234] Glenn Papit (in *Rebotix*) Deposition Transcript and Exhibits, June 2, 2021.
[235] Glenn Vavoso (in *Rebotix*) Deposition Transcript and Exhibits, May 14, 2021.
[236] Greg Posdal (*in Restore*) Deposition Transcript and Exhibits, May 10, 2021.
[237] Greg Posdal 30(b)(1) Deposition Transcript and Exhibits, November 1, 2022.
[238] Greg Posdal 30(b)(6) Deposition Transcript and Exhibits, November 1, 2022.

[239] Greta Bernier Deposition Transcript and Exhibits, November 7, 2022.
[240] John Francis Deposition Transcript and Exhibits, October 14, 2022.
[241] John Sampson Deposition Transcript and Exhibits, November 3, 2022
[242] John Wagner Deposition Transcript and Exhibits, October 11, 2022
[243] Jose Gonzalez 30(b)(1) Deposition Transcript and Exhibits, October 17, 2022.
[244] Jose Gonzalez 30(b)(6) Deposition Transcript and Exhibits, October 17, 2022.
[245] Judith Schimmel 30(b)(1) Deposition Transcript and Exhibits, September 22, 2022.
[246] Judith Schimmel 30(b)(6) Deposition Transcript and Exhibits, November 16, 2022.
[247] Katie Scoville (*in Rebotix*) Deposition Transcript and Exhibits, May 26, 2021.
[248] Katie Scoville (*in Restore*) Deposition Transcript and Exhibits, May 28, 2021.
[249] Kevin May (*in Restore*) Deposition Transcript and Exhibits, June 8 2021.
[250] Kevin May (*in Restore*) Deposition Transcript and Exhibits, May 6 2021.
[251] Kevin May Deposition Transcript and Exhibits, November 3, 2022.
[252] Margaret Nixon Deposition Transcript and Exhibits, October 7, 2022.
[253] Mark Early Deposition Transcript and Exhibits, October 6, 2022.
[254] Mark Johnson (in *Restore*) Deposition Transcript and Exhibits, April 29, 2021.
[255] Marshall Mohr 30(b)(6) Deposition Transcript and Exhibits, November 7, 2022.
[256] Michael Burke Deposition Transcript and Exhibits, September 27, 2022.
[257] Mills Vautrot (*in Restore*) Deposition Transcript and Exhibits, May 11, 2021.
[258] Myriam Curet (in *Restore*) Deposition Transcript and Exhibits, May 7, 2021.
[259] Nicky Goodson 30(b)(1) Deposition Transcript and Exhibits, October 27, 2022.
[260] Nicky Goodson 30(b)(6) Deposition Transcript and Exhibits, November 16, 2022.
[261] Paul Plomin Deposition Transcript and Exhibits, November 8, 2022.
[262] Ricardo Estape Deposition Transcript and Exhibits, October 22, 2022.
[263] Rick Ferreira (*in Restore*) Deposition Transcript and Exhibits, June 7, 2021.
[264] Rick Teal Deposition Transcript and Exhibits, November 18, 2022
[265] Ryan Shaw Deposition Transcript and Exhibits, October 19, 2022.
[266] Sandra Sosa-Guerro Deposition Transcript and Exhibits, September 23, 2022.
[267] Sherry Harvey (*in Restore*) Deposition Transcript and Exhibits, May 14, 2021.
[268] Stacey Donovan (in *Rebotix*) Deposition Transcript and Exhibits, May 27, 2021.
[269] Stan Hamilton (in *Rebotix*) Deposition Transcript and Exhibits, June 4, 2021.
[270] Stan Hamilton Deposition Transcript and Exhibits, November 4, 2022.
[271] Todd Pope (*in Restore*) Deposition Transcript and Exhibits, April 30, 2021.

[272] Todd Tourand Deposition Transcript and Exhibits, November 4, 2022.
[273] Tyler McDonald (in *Restore*) Deposition Transcript and Exhibits, May 21, 2021.
[274] West Gordon (*in Restore*) Deposition Transcript and Exhibits, May 13, 2021.

Form 10-K

[275] Abbott Laboratories, Form 10-K For the Fiscal Year Ended December 31, 2021
[276] Asensus Surgical, Form 10-K 2020 For the Fiscal Year Ended December 31, 2020
[277] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2000
[278] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2001
[279] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2010
[280] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2014
[281] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2017
[282] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2018
[283] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2019
[284] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2020
[285] Intuitive Surgical, Inc. Form 10-K For the Fiscal Year Ended December 31, 2021
[286] Medtronic plc, Form 10-K For the Fiscal Year Ended December 31, 2021

Literature and Textbooks

[287] ABA Section of Antitrust Law, Econometrics 247 (2d ed. 2014).
[288] Agha, Riaz and Gordon Muir, "Does Laparoscopic Surgery Spell the End of the Open Surgeon?" *Journal of the Royal Society of Medicine 96* , No. 11 (2003): 544-546.
[289] Allenby, Greg M. and Peter E. Rossi, "Quality Perceptions and Asymmetric Switching between Brands", *Marketing Science* 10, No. 3 (1991): 185-204.
[290] Areeda, Phillip E., Einer Elhauge, and Herbert Hovenkamp, *Antitrust Law: An Analysis of Antitrust Principles and Their Application, Volume X* , (Boston: Little, Brown and Company, 1996)
[291] Azizian, Mahdi et al., "The da Vinci Surgical System," in *The Encyclopedia of Medical Robotics* , ed. Rajni Patel (New Jersey: World Scientific, 2018), 7.
[292] Berk, Jonathan and Peter DeMarzo, *Corporate Finance, Fourth Edition* (Essex: Pearson Education Limited, 2017).
[293] Carlton, Dennis W. and Jeffrey M. Perloff, *Modern Industrial Organization* , Fourth Edition (Boston: Pearson Education, Inc., 2015).
[294] Choi, Jay Pil, "Mergers with Bundling in Complementary Markets," *Journal of Industrial Economics* 56, No. 3 (2008): 553-577.

[295] Crane, Daniel A. "Market Power Without Market Definition", *Notre Dame Law Review* 90 (2014): 31.

[296] Crompton, Thomas, "Robotic Surgery Equipment Manufacturing," Industry Report OD4074 IBISWorld, December 2020.

[297] Curran, Jack, "Medical Equipment Repair & Maintenance Services," Industry Report OD4964, IBISWorld, December 2021.

[298] Dana Jr., James D. and Kathryn E. Spier, "Bundling and quality assurance," *The RAND Journal of Economics* 49, No. 1 (2018): 128-154.

[299] Davis, Peter and Elana Garces, *Quantitative Techniques for Competition and Antitrust Analysis* (Princeton University Press, 2010).

[300] Dhanani, Naila H. et al., "The Evidence Behind Robot-Assisted Abdominopelvic Surgery: A Systematic Review," *Annals of Internal Medicine* 174, No. 8 (2021): 1-2, 1110-1117.

[301] Elzinga, Kenneth G. and David E. Mills, "The Lerner Index of Monopoly Power: Origins and Uses," *American Economic Review: Papers & Proceedings* 101, No. 3 (2011): 9, 558-564.

[302] Estelami, Hooman, "Consumer Savings in Complementary Product Bundles," *Journal of Marketing Theory and Practice* 7, No. 3 (1999): 107-114.

[303] Evans, David S. and Michael A. Salinger, "The Role of Cost in Determining When Firms Offer Bundles," *The Journal of Industrial Economics* 56, No. 1 (2008): 143-168.

[304] Evans, David S. and Michael Salinger, "Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law," *Yale Journal on Regulation* 22 (2005): 37.

[305] Fisher, Franklin M. and John J. McGowan, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review* 73, No. 1 (1983): 82-97.

[306] Frank, Richard G. and David S. Salkever, "Generic Entry and the Pricing of Pharmaceuticals", *Journal of Economics & Management Strategy* 6, No. 1 (1997), 75–90.

[307] Gawande, Atul, "Two Hundred Years of Surgery," *The New England Journal of Medicine* 366 (2012): 1716-1723.

[308] Kelley, William, "The Evolution of Laparoscopy and the Revolution in Surgery in the Decade of the 1990s," *Journal of the Society of Laparoendoscopic Surgeons* 12, No. 4 (2008): 351.

[309] Kobayashi, Bruce, "Does Economics Provide a Reliable Guide to Regulating Commodity Bundling by Firms? A Survey of the Economic Literature," *Journal of Competition Law and Economics* 1, No. 4 (2005): 707-746.

[310] Lerner, Abba P., "The Concept of Monopoly and the Measurement of Monopoly." *Review of Economic Studies* 1, No. 3 (1934): 157–175.

[311] Lindenberg, Eric B. and Stephen A. Ross, "Tobin's Q Ratio and Industrial Organization", *Journal of Business* , (1981): 1-32.

[312] Longmore, Sally Kathryn et al., "Laparoscopic Robotic Surgery: Current Perspective and Future Directions," *Robotics* 9, No. 2 (2020): 6.

[313] Perloff, Jeffrey M., *Microeconomics, Seventh Edition* (Boston: Pearson Education, Inc., 2015).

[314] Pindyck, Robert S. and Daniel L. Rubinfeld, *Microeconomics, Eighth Edition* (New Jersey: Pearson Education, Inc., 2013).

[315] Pinto, Anna et al., "Surgical complications and their impact on patients' psychosocial well-being: a systematic review and meta-analysis," *BMJ Open* (2016): 1-23.

[316] Qian, Yi, "Brand Management and Strategies Against Counterfeits", *Journal of Economics & Management Strategy* 23, No. 2 (2014), 317–343.

[317] Scitovsky, Tibor , "Economic Theory and the Measurement of Concentration", *Business Concentration and Price Policy, NBER* , (1955): 101-118.

[318] Sheetz, Kyle H., Jake Claflin, and Justin B. Dimick, "Trends in the Adoption of Robotic Surgery for Common Surgical Procedures," *JAMA Network Open* 3, No. 1 (2020): 1-9.

[319] Simons, Joseph J. and Malcolm B. Coate, "United States v. H&R Block: An Illustration of the DOJ's New But Controversial Approach To Market Definition", *Journal of Competition Law & Economics* 10, No. 3 (2014): 543-580.

[320] Tewari, Krishnansu S., "Minimally Invasive Surgery for Early-Stage Cervical Carcinoma: Interpreting the Laparoscopic Approach to Cervical Cancer Trial Results," *Journal of Clinical Oncology* 37, No. 33 (2019): 3075-3080.

[321] Tirole, Jean, "The Analysis of Tying Cases: A Primer," *Competition Policy International* 1, No. 1 (2005): 1-25.

[322] Werden, Gregory, "The History of Antitrust Market Delineation," *Marquette Law Review* 76, No. 1 (1992): 123-215.

[323] Werden, Gregory. "Demand Elasticities in Antitrust Analysis," *Antitrust Law Journal* 66 (1998): 363-414.

[324] White, Lawrence J., "Market Power and Market Definition in Monopolization Cases: A Paradigm Is Missing," in Wayne D. Collins, ed., *Issues in Competition Law and Policy* , American Bar Association, 2008.

Public Sources

[325] "Board Book," Mississippi Board of Trustees of State Institutions of Higher Learning, January 17, 2019, accessed January 7, 2023, http://www.ihl.state.ms.us/board/downloads/boardbooks/1901.pdf

[326] "Clinical Evidence," Intuitive Surgical, Inc., accessed January 6, 2023, https://www.intuitive.com/en-us/about-us/company/clinical-evidence

[327] "Company Fact Sheet," Asensus Surgical, accessed January 5, 2023, https://asensus.com/sites/default/files/media-kit/Asensus%20Fact%20Sheet%20-%202021.pdf

[328] "Da Vinci Surgical System 2022 U.S. Coding and Reimbursement Guide," Intuitive Surgical, Inc., accessed January 5, 2023, https://www.intuitive.com/en-us/-/media/Project/Intuitive-surgical/files/pdf/intuitive-da-vinci-reimbursement-and-coding-guide-1086609.pdf?la=en&hash=8165652F394F52049A8C6B333AFACDA8.

[329] "Da Vinci X/Xi Instrument & Accessory Catalog," October 2021, Intuitive Surgical, Inc., accessed January 6 2023, https://www.intuitive.com/en-us/-/media/ISI/Intuitive/Pdf/xi-x-ina-catalog-no-pricing-us-1052082.pdf

[330] "Franciscan Alliance, Inc. and Affiliates Consolidated Financial Statements with Supplemental Financial Information December 31, 2021 and 2020," Franciscan Alliance, Inc., accessed January 5, 2023, https://www.in.gov/health/files/Franciscan-Alliance-CFS-YE12312021-and-2020.pdf

[331] "High Court Reins In Patent Owners' Post-Sale Power," Ryan Davis Law360.com, May 30, 2017, accessed on January 20, 2023, https://www.law360.com/articles/914742.

[332] "Horizontal Merger Guidelines," August 19, 2010, U.S. Department of Justice, accessed January 4, 2023, https://www.justice.gov/atr/horizontal-merger-guidelines-08192010

[333] "Letter from U.S. FDA to Rick Ferreira at Iconocare Health Re: K210479 dated 11/15/2022," accessed January 6, 2023, available at https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf with attached FDA letter dated 9/30/2022

[334] "Public Hospital District No. 1 of King County, Washington, DBA Valley Medical Center (A Component Unit of the University of Washington) Financial Statements June 30, 2021 and 2020 (With Independent Auditors' Report Thereon)," accessed January 9, 2023, https://www.valleymed.org/globalassets/valley-medical/media/images/about-us/f_248005d-1a_valleymedicalcenter_fs.pdf

[335] "Public Hospital District No. 1 of King County, Washington, DBA Valley Medical Center (A Component Unit of the University of Washington) Financial Statements June 30, 2019 and 2018 (With Independent Auditors' Report Thereon)," accessed January 11, 2023,

[336] "Robotic-Assisted Surgery (RAS) Analyst Update," Medtronic, September 24, 2019, accessed January 12, 2023, https://investorrelations.medtronic.com/download/MDT+RAS+Investor+Update+09242019.pdf

[337] "Solutions for Single-Incision Surgery," Intuitive Da Vinci Xi Single-Site Technology, accessed January 5, 2023, https://www.intuitive.com/en-us/-/media/Project/Intuitive-surgical/files/pdf/1025290ra-isi-brochure-single-site-digital-low-res-394110.pdf?la=en&hash=F24EC0B5DB9C62BDD688F77409A3CA50

[338] "Sustainability Report 2020," Intuitive Surgical, Inc., accessed January 5, 2023, https://isrg.gcs-web.com/static-files/15edd98b-4896-4bd7-a3b4-e2f095a61a61 ("Intuitive 2020 Sustainability Report").

[339] "We Are Valley: UW Medicine Valley Medical Center Fact Sheet," Valley Medical Center, accessed January 5, 2023, https://www.valleymed.org/globalassets/valley-medical/media/vmc_corp·factsheet.pdf.

[340] 510(k) Premarket Notification Summary Letter Regarding K210478 for 8mm Monopolar Curved Scissors, U.S. Food and Drug Administration, Accessed January 12, 2023, https://www.accessdata.fda.gov/cdrh_docs/pdf21/K210478.pdf

Websites

[341] "About the da Vinci Surgical System," UC Health, accessed January 6, 2023, https://www.uchealth.com/services/robotic-surgery/patient-information/davinci-surgical-system/

[342] "About Us," IQVIA, accessed January 16, 2023, https://www.iqvia.com/about-us

[343] "About Us," Surgical Instrument Service Company, accessed November 17, 2022, https://sis-usa.com/about/.

[344] "About Us," Trinity Health, accessed January 5, 2023, https://www.trinity-health.org/about-us/

[345] "UPDATE: Caution with Robotically-Assisted Surgical Devices in Mastectomy: FDA Safety Communication," U.S. Food & Drug Administration, August 20, 2021, accessed January 6, 2023, https://www.fda.gov/medical-devices/safety-communications/update-caution-robotically-assisted-surgical-devices-mastectomy-fda-safety-communication.

[346] "Certified Surgical Instrument Repair Services," Benjamin Biomedical, accessed January 5, 2023, https://benjaminbiomedical.com/

[347] "Company History," Benjamin Biomedical, accessed January 5, 2023, https://benjaminbiomedical.com/company-history.

[348] "Computer-Assisted Surgical Systems," U.S. Food and Drug Administration, accessed January 5, 2023, https://www.fda.gov/medical-devices/surgery-devices/computer-assisted-surgical-systems

[349] "Contact," Intuitive Surgical, Inc., accessed January 6, 2023, https://www.intuitive.com/en-us/about-us/contact.

[350] "Da Vinci Instruments – Trusted dexterity," Intuitive Surgical, Inc., accessed January 6, 2023, https://www.intuitive.com/en-us/products-and-services/da-vinci/instruments.

[351] "Da Vinci Support," Intuitive Surgical, Inc., accessed January 10, 2023, https://www.intuitive.com/en-us/about-us/contact/da-vinci-support.

[352] "Exploring Surgery Options: Open vs. Minimally Invasive," Beaumont, accessed January 5, 2023, https://www.beaumont.org/health-wellness/blogs/exploring-surgery-options-open-vs-minimally-invasive.

[353] "Flexible 'open architecture' instrumentation," Medrobotics, accessed January 6, 2023, https://www.easmed.com/surgical-robot-flex-system/

[354] "Gynecologic Surgery," Valley Medical Center, accessed January 11, 2023, https://www.valleymed.org/services/all-specialties/obgyn-services/gynecologic-surgery

[355] "How da Vinci Works," Community Medical Centers, accessed January 16, 2023, https://www.communitymedical.org/services/robotic-surgery/at-community-regional-medical-center/how-da-vinci-works

[356] "How do hospitals make Purchasing Decisions?" Cleve Holden, accessed January 11, 2023, https://www.linkedin.com/pulse/how-do-hospitals-make-purchasing-decisions-cleve-holden

[357] "How many years of postgraduate training do surgical residents undergo?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/training.

[358] "Ion by Intuitive," Intuitive Surgical, Inc., accessed January 12, 2023, https://www.intuitive.com/en-us/products-and-services/ion.

[359] "Jean Tirole – Facts," The Nobel Prize, accessed January 6, 2023, https://www.nobelprize.org/prizes/economic-sciences/2014/tirole/facts/

[360] "Larkin Health", Larkin Community Hospital, accessed January 5, 2023 https://larkinhealth.com/en/.

[361] "MAUDE – Manufacturer and User Facility Device Experience," U.S. Food and Drug Administration, accessed January 6, 2023, https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm ("MAUDE").

[362] "Methods of Surgery," Johns Hopkins Medicine, accessed January 5, 2023, https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/methods-of-surgery ("Johns Hopkins Medicine").

[363] "Professional versus facility billing: What hospitalists must know," Larry Beresford, June 15, 2021, accessed January 5, 2023, https://www.the-hospitalist.org/hospitalist/article/241539/mixed-topics/professional-versus-facility-billing-what-hospitalists-must.

[364] "Real World Data Sets," IQVIA, accessed January 6, 2023, https://www.iqvia.com/solutions/real-world-evidence/real-world-data-and-insights.

[365] "Reimbursement Resources," Intuitive Surgical, Inc., accessed January 5, 2023, https://www.intuitive.com/en-us/about-us/company/reimbursement

[366] "Restore Robotics", Restore Robotics, accessed January 16, 2023, https://www.restorerobotics.com/

[367] "Robotic Surgery- da Vinci Surgical System," USF Health, accessed January 15 2023, https://health.usf.edu/medicine/urology/robotic_surgery

[368] "Robotic Surgery," Mayo Clinic, accessed January 12, 2023, https://www.mayoclinic.org/tests-procedures/robotic-surgery/about/pac-20394974

[369] "Robotic-Assisted Surgery with da Vinci Systems," Intuitive, accessed January 16, 2023, https://www.intuitive.com/en-us/patients/da-vinci-robotic-surgery

[370] "Services," Surgical Instrument Service Company, accessed November 17, 2022, https://sis-usa.com/services/.

[371] "Side Effects of Surgery," Cancer.Net, accessed January 5, 2023, https://www.cancer.net/navigating-cancer-care/how-cancer-treated/surgery/side-effects-surgery;

[372] "Statement on Credentialing and Privileging and Volume Performance Issues," American College of Surgeons, April 1, 2018, accessed January 5, 2023, https://www.facs.org/about-acs/statements/111-credentialing

[373] "Statements on Principles," American College of Surgeons, accessed January 5, 2023, https://www.facs.org/about-acs/statements/stonprin

[374] "The Senhance Surgical System is the first and only digital laparoscopic platform," Senhance, accessed January 6, 2023, https://www.senhance.com/us/digital-laparoscopy

[375] "TransEnterix Announces Name Change to Asensus Surgical and Introduces a New Category of Surgery, Performance-Guided Surgery," Business Wire, February 23, 2021, accessed January 6, 2023, https://www.businesswire.com/news/home/20210223005444/en/TransEnterix-Announces-Name-Change-to-Asensus-Surgical-and-Introduces-a-New-Category-of-Surgery-Performance-Guided-Surgery

[376] "Understanding your Hospital Bill," MedlinePlus, accessed January 5, 2023, https://medlineplus.gov/ency/patientinstructions/000881.htm

[377] "What are the surgical specialties?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/specialties.

[378] "What is the job description for surgeons?" American College of Surgeons, accessed January 5, 2023, https://www.facs.org/education/resources/medical-students/faq/job-description.

Data

[379] S&P Capital IQ.

[380] Producer Price Index by Industry: Medical Equipment and Supplies Manufacturing (PCU33913391), FRED Economic Data, St. Louis Fed.